THRILLING WONDER STORIES

AUG.

15¢

CASH PRIZES FOR THE BEST SHORT STORY WRITTEN AROUND THIS PICTURE

RACE AROUND THE MOON
A Complete Novel of Lunar Conquest
By OTIS ADELBERT KLINE

THE WARNING FROM THE PAST
A Novelet of the Time Capsule
By ROBERT MOORE WILLIAMS

A THRILLING PUBLICATION

NO SKINNY MAN HAS AN OUNCE OF SEX APPEAL

BUT SCIENCE HAS PROVED THAT THOUSANDS *DON'T HAVE TO BE* SKINNY

Posed by professional models

THOUSANDS OF THIN, TIRED, NERVOUS PEOPLE GAIN 10 TO 25 LBS. . . . NEW STRENGTH *QUICK*

—*with Ironized Yeast Tablets*

Gains 14 lbs. Popular Now

Don Russo

"I had lost weight, had no pep, looked so bad I was ashamed to go out. With Ironized Yeast in 3 months I gained 14 lbs. My new huskiness and pep has brought me lots of new friends, too."

Don Russo, Phila., Pa.

Admired Since He Gained 12 lbs.

"Was losing weight and pep. Nothing helped until I got Ironized Yeast. In 6 weeks I gained 12 lbs. and am full of pep. Everybody admires my physique, too."

Ralph Loeffler
Arlington, Wash.

R. Loeffler

IMPORTANT

Beware of Substitutes

THOUSANDS of skinny, rundown people who never could seem to gain before have quickly put on pounds of solid, naturally attractive flesh, with these remarkable scientifically tested little Ironized Yeast tablets. What's more, instead of that terrible tired feeling and jittery nerves, they now have wonderful new strength and energy, eat well, sleep soundly and with improved looks and new pep have won new friends and popularity.

Why they build up quick

You see, scientists have discovered that many people are underweight and rundown, often tired and nervous, simply because they don't get enough Vitamin B and iron from their daily food. Without these vital substances you may lack appetite and not get the real body-building good out of what you eat.

Now you get these exact missing substances in these amazing little Ironized Yeast tablets. The improvement they bring in a short time to those who need Vitamin B and iron is often astonishing. Thousands report gains of 10 to 25 lbs., wonderful new pep—a new natural attractiveness that wins friends everywhere.

Make this money-back test

Get Ironized Yeast tablets from your druggist today. If with the first package you don't eat better and FEEL better, with much more strength and pep—if you're not convinced that Ironized Yeast will give you the normally attractive flesh, new energy and life you have longed for, the price of this first package promptly refunded by the Ironized Yeast Co., Atlanta, Ga.

Only be sure you get the genuine Ironized Yeast, and not one of the cheap, inferior substitutes often offered which do not give the same results. Look for the letters "IY" stamped on each tablet.

Special offer!

To start thousands building up their health right away, we make this special offer. Purchase a package of Ironized Yeast tablets at once, cut out the seal on the box and mail it to us with a clipping of this paragraph. We will send you a fascinating new book on health, "New Facts About Your Body." Remember, results with the first package—or money refunded. At all druggists. Ironized Yeast Co., Inc., Dept. 778, Atlanta, Ga.

TUNE IN ON JOHN J. ANTHONY'S HELPFUL GOOD WILL HOUR. See your local newspaper for exact time and station.

SNUFFS OUT FIRES LIKE MAGIC

The LIFE SAVER NEW THREE WAY FIRE EXTINGUISHER

Works Automatically, Also As Hand Sprinkler or Grenade

At last, a real fire extinguisher priced within the reach of all. It automatically releases 24 ounces, by weight, of fire extinguishing fluid to snuff out fires. Works perfectly as a hand sprinkler and also can be used as a hand grenade.

Standard model—for homes, factories, garages, barns, stores, boats, trailers, summer homes, etc. (Attractive in appearance.) $1.65

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LIFE SAVER COMPANY

2227-AZ, Calumet Ave. Chicago, Ill.

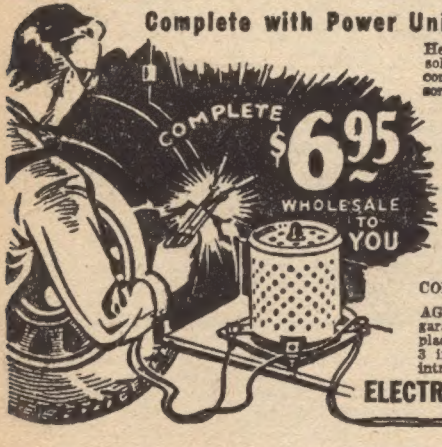
Here is the Standard Model, fitted with a beautiful parchment shade, to make it ornamental for living rooms, etc.

NOW! Anyone without experience can do a thousand and one REPAIR JOBS!

WELDING BRAZING SOLDERING

QUICKLY PERFECTLY EASILY with the NEWLY INVENTED 3 IN 1 Electric TORCH

Complete with Power Unit—Works Off 110 Volt AC or DC Light Circuit



Here at last is a portable machine that does real welding, brazing and soldering, yet is priced within the reach of all. The 3 in 1 comes to you complete with goggles, carbons, various types of welding rod and all accessories needed to do various repair jobs. It is all ready to plug in a light socket—nothing extra to buy. Simple instructions make it possible for you to do first class work easily without any previous experience or mechanical skill. The 3 in 1 instantly creates a terrific flame by just touching the carbons together.

REPAIRS FENDERS, AUTO BODIES, TANKS, BICYCLES, RADIOS, ETC.

The 3 in 1 is ideal for auto body repairs and fender weld jobs and steam fitters, plumbers, sheet metal shops, engineers, maintenance men and janitors will find it indispensable. By following simple instructions, heavy work such as bumpers, tanks and industrial repairs can be done. Ideal for the countless jobs around a home or farm. WORKS ON ALUMINUM, BRASS, COPPER, IRON, STEEL AND OTHER METALS.

AGENTS! You will find quick easy sales waiting for you in repair shops, garages, factories, sheet metal, radio and bicycle Repair shops, and many other places. Write at once for free particulars and learn how you can get your own 3 in 1 Electric Torch absolutely free for demonstration purposes by helping to introduce it to others.

ELECTRO-TORCH CO., 2613-EC Michigan Ave., Chicago, Ill.

THRILLING WONDER STORIES

The Magazine of Prophetic Fiction

Vol. XIV, No. 1

August, 1939

IN THE NEXT ISSUE

PLANET OF ETERNAL NIGHT

A Complete Novel of Man's Last Outpost

By JOHN W. CAMPBELL, JR.

THE ENERGY EATERS

A Complete Novelet of Hollywood-on-the-Moon

By ARTHUR K. BARNES and HENRY KUTTNER

THE SCOURGE BELOW

A Novelet of Subterranean Rule

By SAM MERWIN, JR.

VIA VENUS

A Short Story

By GORDON A. GILES

—and many others!

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Cash prizes for the most interesting letters based on this cover! See Page 116 for details.

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Manuscripts must be accompanied by self-addressed, stamped envelopes, and are submitted at the author's risk.

Be a Radio Expert

Many make $30 $40 $50 a week

J. E. SMITH, Pres., National Radio Institute
Established 25 years
He has directed the training of more men for the Radio Industry than anyone else.

I will train you at home for many Good Spare Time and Full Time Radio Jobs

Radio offers you many opportunities for well-paying spare time and full time jobs. And you don't have to give up your job, leave home or spend a lot of money to train to get these jobs—to become a Radio Expert.

Get Ready Now for Jobs Like These

Radio broadcasting stations employ engineers, operators, station managers and pay well for trained men. Fixing Radio sets in spare time pays many $200 to $500 a year—full time jobs with Radio jobbers, manufacturers and dealers as much as $30, $40, $50 a week. Many Radio Experts open full or part time Radio sales and repair businesses. Radio manufacturers and jobbers employ testers, inspectors, foremen, engineers, servicemen, in good-pay jobs with opportunities for advancement. Automobile, police, aviation, commercial Radio, loud speaker systems are newer fields offering good opportunities now and for the future. Television promises to open many good jobs soon. Men I trained have good jobs in these branches of Radio. Read how they got their jobs. Mail coupon.

Set Servicing

Fixing Radio sets in spare time pays many $5, $10, $15 a week extra while learning. Full time repair work pays as much as $30, $40, $50 a week.

Broadcasting Stations

Employ managers, engineers, operators, installation and maintenance men for fascinating jobs and pay well for trained men.

Loud Speaker Systems

Building, installing, servicing and operating public address systems is another growing field for men well trained in Radio.

Why Many Radio Experts Make $30, $40, $50 a Week

Radio is young—yet it's one of our large industries. More than 28,000,000 homes have one or more Radios. There are more Radios than telephones. Every year millions of Radios get out of date and are replaced. Millions more need new tubes, repairs. Over $50,000,000 are spent every year for Radio repairs alone. Over 5,000,000 auto Radios are in use; more are being sold every day, offering more profit-making opportunities for Radio experts. And RADIO IS STILL YOUNG, GROWING, expanding into new fields. The few hundred $30, $40, $50 a week jobs of 20 years ago have grown to thousands. Yes, Radio offers opportunities—now and for the future!

Many Make $5, $10, $15 a Week Extra in Spare Time While Learning

The day you enroll, in addition to our regular Course, I start sending Extra Money Job Sheets; show you how to do Radio repair jobs. Throughout your training I send plans and directions that made good spare time money — $200 to $500 — for hundreds, while learning.

Here's How You Get Practical Experience While Learning

I send you — special Radio equipment; show you how to conduct experiments, build circuits illustrating important principles used in modern Radio receivers, broadcast stations and loud-speaker installations. This 50-50 method of training—with printed instructions and working with Radio parts and circuits—makes learning at home interesting, fascinating, practical. I ALSO GIVE YOU A MODERN, PROFESSIONAL ALL-WAVE, ALL-PURPOSE RADIO SET SERVICING INSTRUMENT to help you make good money fixing Radios while learning and equip you with a professional instrument for full-time jobs after graduation.

Money Back Agreement Protects You

I am so sure I can train you to your satisfaction that I agree in writing to refund every penny you pay me, if you are not satisfied with my Lessons and Instruction Service when you finish. A copy of this agreement comes with my Free Book.

Find Out What Radio Offers You

Act Today. Mail the coupon now for "Rich Rewards in Radio." It's free to any fellow over 16 years old. It points out Radio's spare time and full time opportunities and those coming in Television; tells about my training in Radio and Television; shows you letters from men I trained telling what they are doing and earning. Find out what Radio offers YOU! MAIL COUPON in an envelope, or paste on a postcard—NOW!

J. E. SMITH, President
Dept. 9H09, National Radio Institute
Washington, D. C.

HERE'S PROOF THAT MY TRAINING PAYS

$50 Monthly in Spare Time

"I work on Radio part time, still holding my regular job. Since enrolling seven years ago, I have averaged around $50 every month." JOHN B. MORISSETTE, 809 Valley St., Manchester, N. H.

Makes $50 to $60 a Week

"I am making between $50 and $60 a week after all expenses are paid, and I am getting all the Radio work I can take care of, thanks to N. R. I." H. W. SPANGLER, 126½ S. Gay St., Knoxville, Tenn.

Operates Public Address System

"I have a position with the Los Angeles Civil Service, operating the Public Address System in the City Hall Council. My salary is $170 a month." R. H. ROOD, R. 136, City Hall, Los Angeles, Calif.

This Coupon is Good for ... One FREE Copy of My Book

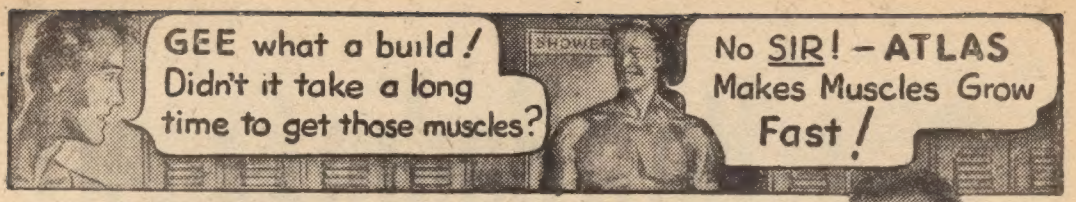
J. E. SMITH, President, Dept. 9H09
National Radio Institute, Washington, D. C.

Dear Mr. Smith: Without obligating me, send "Rich Rewards in Radio," which points out the spare time and full time opportunities in Radio and explains your 50-50 method of training men at home in spare time to become Radio Experts. (Please Write Plainly.)

NAME..... AGE.....

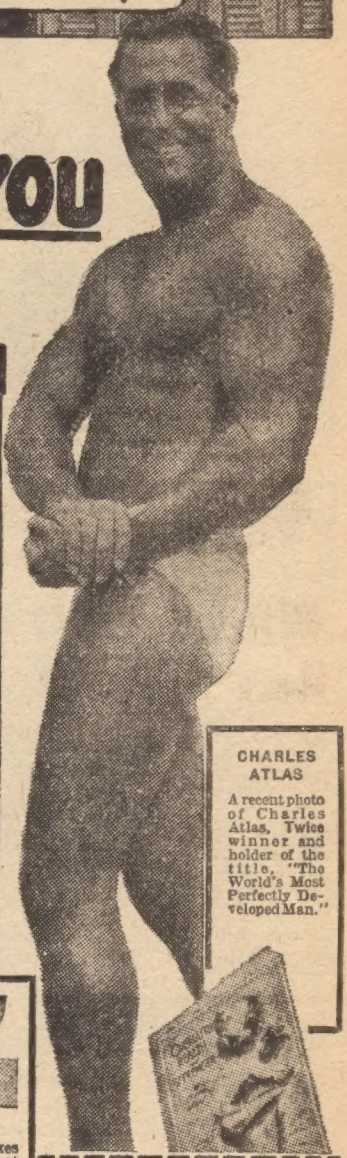
ADDRESS .....

CITY..... STATE.....



Will You Let Me PROVE I Can Make YOU a *New Man?*

LET ME START SHOWING RESULTS FOR YOU
5 inches of new Muscle
"My arms increased 1½" chest 2½", forearm ⅞".; —C. S., W. Va.
What a difference!
"Have put 3½" on chest (normal) and 2½" expanded." — F. S., N. Y.
Here's what ATLAS did for ME!
John Jacobs BEFORE
John Jacobs AFTER
For quick results I recommend CHARLES ATLAS
"Am sending snapshot showing wonderful progress. Certainly recommend you for quick results."—W. G., N. J.
GAINED 29 POUNDS
"Your method gives long, smooth muscle. When I started, I weighed only 141. Now weigh 170." T. K., N. Y.


CHARLES ATLAS
A recent photo of Charles Atlas, Twice winner and holder of the title, "The World's Most Perfectly Developed Man."

7-Day TRIAL OFFER

I could fill this whole magazine with enthusiastic reports from OTHERS. But what you want to know is—"What can Atlas do for ME?"

Find out—*at my risk!* Just give me a 7-day trial. Just one week!—and even in that short time I'll start giving RESULTS. AND it will be the kind of RESULTS that you (and anyone else) can SEE, FEEL, MEASURE with a tape!

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I will award it to my pupil who makes the most improvement in his development within the next three months.

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I myself was once a 97-pound weakling—sickly, half-alive. Then I discovered "Dynamic Tension." And I twice won the title, "The World's Most Perfectly Developed Man"!

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Why not risk a postage stamp? Send coupon for my 48-page illustrated FREE BOOK AT ONCE! Address me personally: Charles Atlas, Dept. 77-H, 115 E. 23rd Street, New York, N. Y.

CHARLES ATLAS, Dept. 77-H,
115 East 23rd Street,
New York, N. Y.

I want the proof that DYNAMIC TENSION will help make a new man of me—give me a healthy, husky body and big muscle development. Send me your free book, *"Everlasting Health and Strength"*—and full details of your 7-DAY Trial Offer.

Name .....
(Please print or write plainly)

Address .....

City..... State.....

You think you *can't* learn Music?

Just try this!

Easy as A-B-C

Look at the notes above—they are: F-A-C-E. Could anything be simpler to remember? You have already begun to learn to read music. And it's just as easy to *play*, for a remarkable invention, the "Note-Finder," tells you just where each note is located on the piano.

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IF YOU have ever had any desire to play a musical instrument—if you have ever longed for the good times, the popularity and friendships that music makes possible, then here is amazing proof that you CAN learn to play—easily, quickly, in spare time at home. What's more, in just a short time from today, you can actually be PLAYING. Yes, playing the piano, the violin, or whichever instrument you please. Playing the latest popular songs, the old-time favorites, even classical music.

No Knowledge of Music Required

Forget all you have ever heard about music being hard to learn. Dismiss your fears of tedious study and practice. Never mind if you do not know a single note of music.

This modern way to learn music will open your eyes! It's *easier* than you ever thought possible—and it's FUN. No old-fashioned drudgery, no tiresome drills and exercises. Instead, you start learning to play real tunes by note almost at once. You are thrilled to discover that you can actually create music! Soon you are experiencing the joys of musical self-expression. Soon you are winning popularity; you are being showered with compliments and applause.

Make Money, too!

Perhaps you have never thought of making money with music. But you may be pleasantly surprised to find how many opportunities it brings! Others have quickly started turning spare hours into cash and not a few have been launched on brilliant musical careers.

Does it all seem "too good to be true?" Then send for the Free Proof. Mail the coupon for the fascinating illustrated booklet that tells all about this wonderful way to learn music at home—in just a few minutes a day—without a private teacher, without any special talent or previous training. With the booklet you'll also receive a free Demonstration Lesson that shows exactly how it is done.

FREE—Just Mail Coupon!

Over 700,000 others have already been convinced. Surely, if *you* earnestly want to learn to play, you owe it to yourself to examine the proof. There is no cost or obligation in writing. Just mention the instrument that interests you. If you do not already own one, we can arrange to supply it on easy terms. U. S. School of Music, 2947 Brunswick Building, New York, N. Y.

Forty-first Year (Est. 1898)

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PICK YOUR FAVORITE

Piano	Ukulele	Piano Accordion
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Guitar	Trumpet	Drums and Traps
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	Organ	

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New York, N. Y.

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Have you Instr.?.....

Name.....

Address.....

City.....State.....

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COSTS ONLY $1 PER MONTH

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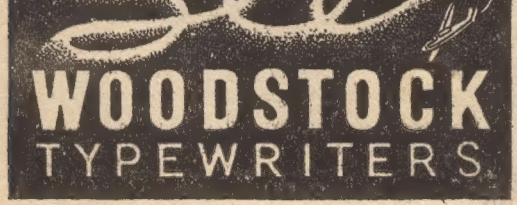

THE SWAP COLUMN

Here's where you can exchange something you have but don't want for something someone else has that you do want. This is a FREE service.

Limit your request to 25 words. No goods for sale listed, nor requests concerning firearms or any illegal articles.

IMPORTANT: No "swaps" of back magazine issues are listed. This rule has been adopted to safeguard the health of our readers. Back numbers of magazines are known disease-carriers.

Type or hand-print clearly in submitting announcements. THRILLING WONDER STORIES will not be responsible for losses sustained. Make plain just what you have and what you want to "swap" it for. Enclose a clipping of this announcement with your request. Address: Swap Column, THRILLING WONDER STORIES, 22 West 48th Street, New York, N. Y.

Want all kinds of odd and interesting photos and snapshots. Have thousands of same for exchange of world-wide interest. Paul Hadley, Piggott, Arkansas.

Will swamp stamp collection, physical culture course for good camera. Leslie Grant Smith, 29 Roydon Grove, Lincoln, England.

Have Argus 35mm. candid camera like new. Want stamps or what have you? James E. Wilhelm, Box 693, Elkins, W. Va.

Radio parts, meters, testing instruments, service manuals, books, etc., wanted. Have large list of trades. Exchange lists. G. H. Reed, 281 Pleasant Street, Malden, Mass.

U. S. or foreign used postage stamps for U. S. or foreign stamps. Fred Kane, 818 N. Second Avenue, W. Newton, Iowa.

Wanted: Medium stamp-collector correspondents anywhere to exchange stamps, especially coronations, jubilees, pictorials, or other modern issues, etc. Donald Tuck, 5 Waverley Avenue, Hobart, Tasmania, Australia.

I have a microscope, bow and arrows, golf clubs, stamps, and coins. What have you to trade? Tom J. Caldwell, 503 North Creek, Drumright, Okla.

Post cards bearing 1c U. S. series 1902. Other postcards printed 1900-1910. Many foreign, U. S. stamps. Want old money, stamps, or? Charles Florance, 924 Connecticut St., Lawrence, Kansas.

Have harmonica, pennants, 300 marbles, 200 stamps, monopoly, card games, 3 flashlights, match-books. Want match-books, old U. S. and foreign coins, or? Art Hager, 508 North Third, Oskaloosa, Iowa.

Swap coins, radio parts, U. S. 8 Rectilinear lens, suitable for enlarger or camera, for photo goods, radio supplies, what have you? List on request. Charles H. Chandler, 920 College Avenue, Wooster, Ohio.

Wanted: "Henry" cards. Also want collectors to exchange cigarette and trade cards with. I have over 100,000 for exchange. Jack Murtagh, 625 Nelson Street, Hastings, New Zealand.

Stamp collectors! Diamonds, triangles, French colonials, all mint for other stamps or? Richard Switzer, 4565 Bleumound, Milwaukee, Wisc.

Will swap U. S. Navy covers for F. D. or other navy covers. Please send lists. Jim Anderson, Gansner Bar, Belden, Calif.

Attention Match Cover collectors: Send me 50 different covers and receive same amount in return. Will answer all letters. D. W. Kerensky, 556 High St., Youngstown, Ohio.

Swap gold and silver coins, stamps, radio, miscellaneous items for offers, stamps, auto radiator emblems, hobby goods. Rudolph Zak, 2509 East 89th, Cleveland, Ohio.

MEN —If you are mechanically inclined and interested in

DIESEL

INVESTIGATE the Hemphill Diesel training programs, which have been developed over a period of years and represent the accumulated experience of many American and European Diesel engineers.

PRACTICAL Diesel and Diesel-electric training. . . You may start the course at home, and complete it in any of the shops and laboratories operated by the Hemphill Schools—America's Original Exclusive Diesel Training Institution.

INTERESTING You will find Hemphill Diesel training practical — absorbing — useable. Your training includes work on industrial, transport and marine engines—installation, repairs and operation. The "March of Diesel" describes the various courses.

HEMPHILL DIESEL SCHOOLS

own and operate resident training schools and shops at these eight important marine and industrial centers—

Boston—124 Brookline Avenue
New York—31-31 Queens Boulevard, L. I. C.
Detroit—2348 West Lafayette Blvd
Chicago—2030 Larrabe Street
Memphis—149 Monroe Avenue
Los Angeles—2010 San Fernando Road
Seattle—515 Dexter Avenue
Vancouver, B. C.—1367 Granville Street

Applications for enrollment will be accepted from English speaking students residing in foreign countries. Write for special terms.

Hemphill Diesel Schools *(use nearest address)*
Please send data on your Diesel courses, also copy of the booklet "March of Diesel."

NAME_____ AGE___

STREET_____

CITY_____ STATE_____ *m-39-1*

Calling All Cars!

A MYSTERIOUS DISCOVERY SAVES UP TO 30% on GASOLINE!

OR COSTS NOTHING TO TRY

Answer this call! Investigate this remarkable discovery that trims dollars off gasoline bills —gives you worthwhile gas savings—more power — greater speed — quicker pickup — faster acceleration. Proven so efficient, it is guaranteed to save up to 30% and give better performance or the trial costs you nothing.

Automatic Supercharge Principle

Vacu-matic is *entirely different!* It operates on the supercharge principle by automatically adding a charge of extra oxygen, drawn free from the outer air, into the heart of the gas mixture. It is entirely automatic and allows the motor to "breathe" at the correct time, opening and closing *automatically* as required to save dollars on gas costs.

VACU-MATIC Scores Again

SETS NEW COAST-TO-CHICAGO RECORD

BOB McKENZIE

Vacu-matic Corporation
7617 W. State Street
Wauwatosa, Wisconsin

Dear Sirs:

Having just completed a non stop record between Los Angeles and Chicago, driving a Chevrolet equipped with a Vacu-matic carburetor control, I thought you might be interested in knowing some of the facts and the important part Vacu-matic played in the success of the run.

The distance covered was 2323 miles in thirty-nine hours and forty-two minutes, officially timed by Western Union, which gave us an average speed of 59.7 M.P.H. based on elapsed time and with the Vacu-matic averaged 18-1/2 miles per gallon on gasoline.

Before leaving Los Angeles, we made several test runs both with and without the Vacu-matic, and the tests proved that Vacu-matic increased my gas mileage 3-1/2 miles per gallon at the driving speed of 60 M.P.H. and also very noticeable increase in both acceleration and power.

Yours very truly,
Bob McKenzie

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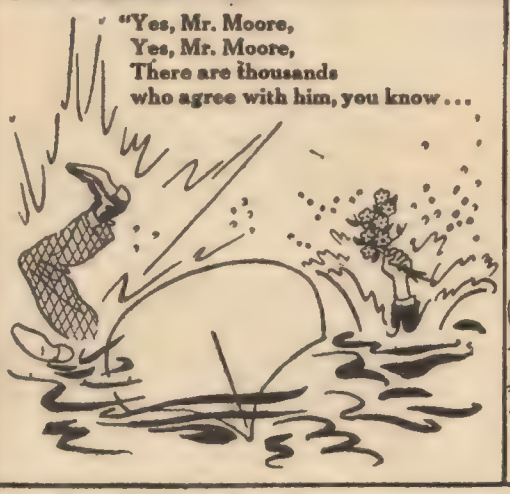

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A Complete Novelet of the World Beyond the Stars!

Hundreds of millions of bombs were discharged

THE MAN FROM XENERN

By STANTON A. COBLENTZ

Author of "The Sunken World," "The Making of Misty Island," etc.

CHAPTER I

The Soarers

I WAS born on the planet Xenern, the fifth world of the inner circle of the star Alpha Centauri. Ours was a fertile and well-watered globe, insignificant in size, being not more than thirty thousand miles around, but fitted to nourish an abundant life. Throughout hundreds of thousands of recorded years, it had supported an innumerable progeny.

My own species, consisting of red-skinned bipeds with long prehensile tails and heavy black spines in place of hair, had had difficulty to achieve pre-

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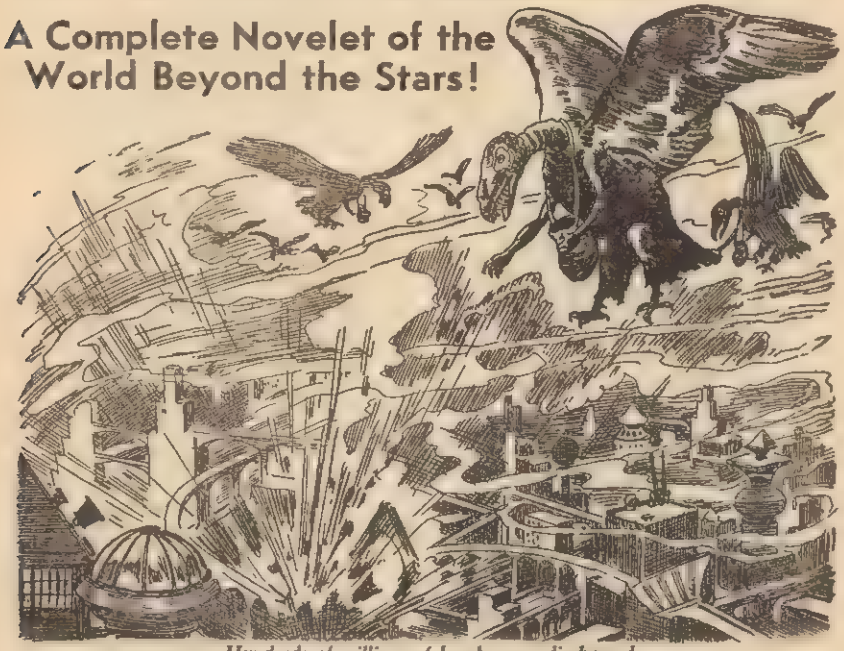

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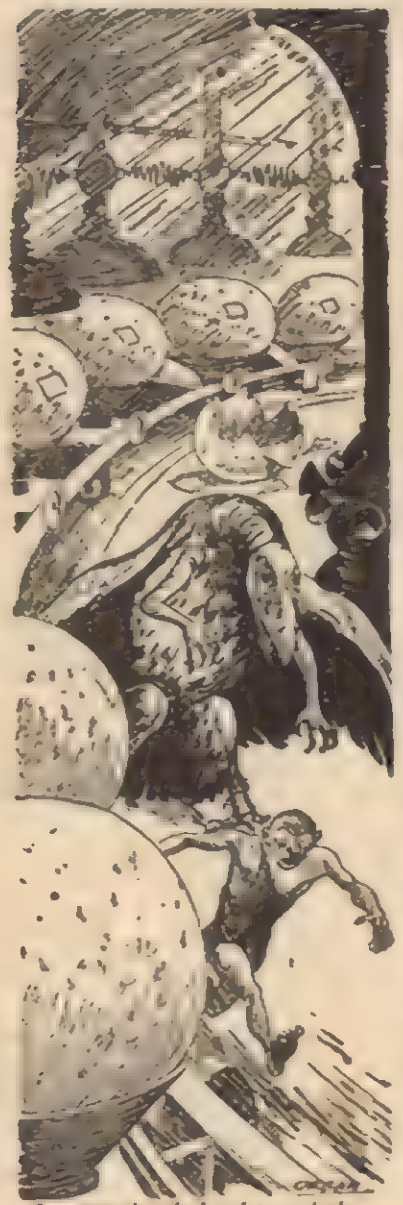

Forgetting the tube I took to my heels

eminence among the multitude of walking and flying creatures, many of them of a high order of intelligence. But at length, aided by the discovery that they could make fire by striking two sharp sticks together, our people began to rise above all other animals.

They learned how to build ships and cities, to make the mines and forests obey them. Then contrived shrewd inventions to speak through space, and burrow underground, and persecute the other sharers of the world.

This was in the day of their greatness, which lasted thousands of years, and taught them art and science. But they no longer used their limbs, and these became thin and short. Their bodies became flabby and short. And their minds, not being used as of old, became flabby and short and fat.

HISTORIANS have long debated the cause of our decline, but to me the reason seems clear. After a time, dissension arose. We became divided into tribes and nations, and began to take one another's lives, justifying the slaughter by the sacred name of *klicklangg* or war. During several thousand years, the combats gradually became more bloody, costing the lives of our ablest citizens, and transforming the world into a vast armed camp.

During all this time, we had hunted and slain the lesser inhabitants of the world, exterminating many species and decimating most others. Yet some formidable creatures survived. Among these were the *Angos* or Soarers—giant green-feathered birds which had been the terror of our remote forbears, with their huge golden eyes, manlike pointed noses, crocodile teeth, and two arms each in addition to vulturelike talons.

But more important than their imposing appearance was the alertness of their minds, for they proved equal in intelligence to our own race, which they contemptuously refer to as *Histhas* or Crawlers. For centuries, while we were fighting, they were developing a civilization on the mountain peaks—a civilization about which I

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shall have more to say a little later.

First let me relate how they made themselves masters of the world. Strangely enough their means of triumph was a weapon we ourselves had put into their hands — an obnoxious bomb, known as the Shattergas.

The principle behind it was simple. The object had been to create a bomb which, powerful as an explosive, would be equally destructive by virtue of the fumes which it would release to hover about the planet's surface. This end was far from easy to attain, for the by-products of an explosion, though often poisonous, are usually dissipated rapidly.

However, there are some common gasses which are fairly stable. One such is carbon monoxide. Being heavier than air, it would linger close to the ground; being colorless and odorless, it would not be easily detected; and, being capable of producing death when used in quantities of less than one-half of one percent of the atmosphere by volume, it would exact a gratifying toll.

The main problem was to generate gas that would survive an explosion, for ordinarily the accompanying heat would convert it into carbon dioxide. The only possible method, it seemed, was to keep it isolated from the air after the discharge. And this was accomplished by the Shattergas, which would throw off steel capsules laden with compressed monoxide.

After a few minutes, the pressure of the gas would burst the thin walls of the container, and the poison would mingle with the atmosphere. Hence a calculable number of bombs would make human life in any region impossible.

One would think that military leaders might have hesitated to use a weapon of such potentialities. Yet, from the first, there was never any doubt that the Shattergas would be employed—and employed by all countries alike, thanks to a system of espionage which made the inventions of every nation common property.

During the following year, conse-

quently, hundreds of millions of bombs were discharged in all parts of Xenern. And hundreds of millions of persons succumbed.

A thick blanket of monoxide overhung plains, valleys, and sea-coasts. Nearly all animal life, except of the winged variety, became extinct; while efforts to get rid of the poison by means of combustion were like attempts to bail out a sinking boat with a thimble.

For the moment, warfare was forgotten. Old antagonisms were cast away as friend and foe in terror rushed side by side to the highlands. The very fabric of civilization was ripped apart, and the survivors were forced back to primitive methods of life.

And it was just then, in the moment of our fatal weakness, that the green-winged birds, or Soarers, came down to challenge our supremacy!

All this happened long before I was born, and I draw my reports from tradition only, since at this point authentic history ends. However, the stories passed down from generation to generation agree in all essentials.

Secure in their mountain wilderness, the Soarers had long been planning an attack. Unobserved by us—for they flew a mile high, yet their keen eyes could make out all our maneuvers—they had followed our warfare; and occasionally one of them, swooping down upon our battlefields, had made away with some unwary soldier, who had offered a tempting morsel.

EVEN had it not been for the Shattergas, they might eventually have struck. But it was the Shattergas that made us their easy prey.

It was not only the direct action of the explosive that had crippled us, it was the fact that the Soarers, watching with their telescopic eyes, had penetrated our secrets, spied out vast unused stores of the bomb, and employed these against their makers.

Thus began a new form of warfare. We were hunted like rats. Squadrons of Soarers began to appear from all points of the horizon, darting down upon us with the speed of projectiles. And they who could not instantly find cover were carried off for some devilish feast.

It will never be possible to determine how many hundreds of millions succumbed to pestilence, terror and starvation, and to direct attack. All that is certain is that our race was on the road to annihilation—which would have been inevitable had it not been for an unforeseen turn of events. The Soarers, while capable of almost inconceivable ferocity, were not lacking in imagination.

Eventually it occurred to them that we might be worth more alive than dead! Long before, they had domesticated a little four-legged barking beast, which served them faithfully in their eyries. Now some genius conceived the idea that man would make a not less useful domestic animal.

After a time, consequently, the attacks upon us became less murderous. Those who could be taken alive were no longer deliberately injured. They were carried off to the roosts of the Soarers, where they were converted into servants—or rather slaves.

Naturally, the more strong-willed rebelled. But of what use was resistance when a single stroke of the talons or blow of the beak could forever end their dissent?

And so our species was imprisoned. We learned the language of our masters, and could talk with them as subjects do with their sovereign. We looked after their homes, and in turn received our food, so being placed on a level with the barking four-legged beast.

What a dreary life we endured! Let me say a word of my own experiences, which in many ways were only typical.

And yet, in other ways, they were not typical. For I had been born free. Yes, actually free! While most of my race was enchained a few scattered survivors had been able to escape detection amid the caves of the desert or in the thicknesses of the forest.

Generation after generation had lived beneath the shadow of the Soarers, by whom they might at any time

be captured. As the years went by, most of the heroic little groups had been annihilated, until in my own day probably not half a dozen remained.

CHAPTER II

Captive on the Heights

FROM infancy, my life was one of flight and terror. My earliest recollections have to do with tales of the Soarers, who were painted as hobgoblins that might drop down from the sky and devour me.

My tribe, numbering less than fifty, had sought refuge in the equatorial forests of the vast continent of Hoo; and, lest their dwelling-place be discovered, they were constantly in migration. Thus from birth I knew no home except the ever-shifting jungle scenes, amid which my people, reverting to the habits of apes, earned a difficult living from wild fruits, roots and berries, while gradually they declined to the level of their neighbors, the monkeys.

The only couch I ever knew was the trees, from which I would hang, simian-like, by my tail. The only companions of my childhood were the creatures of the wild.

But in time all this was to change. I had scarcely arrived at early youth when we were revisited by the ancestral enemy. One day my father, who had been gathering herbs in a meadow at the edge of the forest, did not return to our encampment. I was sent in search of him. Little realizing the danger, I went cheerily along my way, whistling a tune as I came out into the fatal fields. Upon entering the meadow, I was a little taken aback at not seeing my father, but, with the recklessness of youth, began to call in loud tones. And for this bit of folly, how heavily I was to pay!

Before I had uttered half a dozen syllables, I became aware of a shadow above me—a shadow so vast as to obscure the sun. For the fraction of a second I was paralyzed. Then, glancing upward, I caught a flash of brilliant green, and saw great wings outspread—great wings swooping down with the speed of a falling star. Imagine my horror! Taken by surprise, I could only scream, and rush back toward the woods in a panic.

Halfway to shelter, I felt my shoulders seized in an iron grip. I felt sharp talons digging into my flesh until I shrieked in agony. I felt myself jerked from the ground, and then swung through the air with breath-taking speed.

Fainting and at times nearly unconscious, I had no clear idea what was happening. I only knew that I was being lifted through tremendous spaces.

I saw the green fields, the undulating jungle spread beneath me in an endless hazy sheet. Then upward, upward I soared, straight toward a distant snowy range.

It could not have been many minutes before, dazed with fright and still half swooning, I was jarred to earth in a place of overtowering rocks. My captor, as large as a palm tree, was standing before me with furled wings, his great golden eyes glaring with a possessive glitter, his immense mouth with the crocodile teeth opening as if to devour me.

Now I knew how a rat in a trap must feel! Cowering, I shrank back against a cliff wall. The monster, drawing apart his lips and revealing the red cavern within, uttered a screech like a parrot's—except that it was shriller, and grated more severely on my nerves.

At this signal there arose a great fluttering from the black mouths of half a score of caves, and a queerly assorted crowd came flying, leaping and creeping forth. Most of them were of the same species as my captor—gigantic green-feathered birds, with huge chinless heads and golden eyes. But they were of all sizes, and included infants not more than six or eight feet tall.

I OBSERVED some of the barking four-legged beasts I had heard of, and noticed that they were fondled and treated with every sign of affection. I also saw some members of my

own race. I cannot tell you how indignant I felt to notice that my brothers, unlike the barking animals, were not shown any kindness or respect. I could almost have wept to see how they were pecked at by some of the Soarers, and prodded by the talons of others; and how they walked like outcasts, with heads bent low, tails curled between their legs, and seamed red faces marked with bruises and cuts.

I did not know why, but soon I became the center of attention for this mob. They crowded about me, screeching and muttering. Some felt me tentatively with their claws, others jabbed me appraisingly with their beaks. One or two, when I resisted them, slashed me with their teeth—and when, naturally, I roared with pain, they gave out a howl as of a great wind, which I learned to be their way of laughing.

Finally, after they had wearied of examining me—for being no more than a "wild animal" I soon ceased to amuse them—a particularly obnoxious bird shouldered to the fore and seized me in delighted hands. She—I discovered that she belonged to the "hardier sex"—was a gawky thing little more than a quarter grown, and consequently not much taller than an elephant. Her feathers, as was common among the children of the Soarers, were fringed with yellow; and her golden eyes had the mischievous glitter of a spoiled infant.

It was my misfortune that, for some unknown reason, she had conceived an affection for me. Having seized me in her hands, she squeezed me to her heart in a grip that took my breath away. Struggling in vain, I thought my last moment had come.

Some of the elders started to remonstrate with the youngster in a series of quick, excited gabblings. But she responded with a scream that nearly burst my ear-drums, and when one of the larger birds tried to take me from her, she began to stamp and yell, all the while pressing me to her breast in crushing fingers.

Was I to die thus? No! I was to be reserved for further torments. Finally, while she withdrew sulkily to one side, her elders put their heads together in a grave consultation. After it was over, one of them uttered a single syllable and she, with a shriek of delight, hugged me to her more closely than ever, and ran off with me into the depths of one of the caves.

As she raced away, her grip upon me loosened. Yet I was as nearly dead as alive by the time she had dashed a few hundred yards and halted. I then found myself in an enormous gallery, with steep rocky walls scores of yards apart and a tall irregular rocky ceiling pierced by rifts that admitted a vague twilight.

Perched here and there among the boulders along the clifflike sides of the hall were birds of all sizes, some hanging downward by their talons, others upright and motionless; while occasionally one would cause a great disturbance by flying from side to side of the chamber with a tremendous flapping of wings. None, however, took any notice of our arrival, with the exception of three or four partly grown Soarers, little larger than the female Soarer who now owned me, who came darting and screaming to meet us.

Each of these, I observed, had some pet animal in his hand. The foremost caressed one of the little barking beasts. Another fondled a lion cub, while a third held one of my own race, which, after a moment, I recognized as my father!

THE impudent young bird was grasping my poor parent securely in one hand, while plucking at the gray spines of his beard, half of which had been pulled out!

Let me pass over that dread moment, which was in many ways the most horrible of my life. My rage was such that I longed to rise and strike down the oppressor. Never before had I so rued my own weakness! The tears came to my eyes, but I could do nothing!

Both of us were whirled away at the whim of our captors. We were shoved and pushed about like toys. We were tossed high in air, and caught like

bean-bags. Our arms and legs were pulled until they were almost dislocated; our clothing was stripped from our bodies. We were unmercifully pummeled and pinched—and all the while gusts of merriment showed how much the young innocents were enjoying the sport.

But finally, to our great relief, the fledglings wearied of the games, and abandoned us for the day. Then it was that a full-grown bird strode forth, fastened collars about our necks, and chained us to a large rock, leaving us barely room to walk the length of our bodies. There we were fed some reeking food and were each given a beaker of foul water and some dry grass, and left to make our beds for the night.

I now turn ahead a considerable period, during which I gradually became reconciled to my new life. Bit by bit I was learning the language of the Soarers for, being naturally quick of observation, I had picked up many words. Also my young mistress—Cluck-Clux, as she was called—found it entertaining to make me repeat certain phrases after her and prove to her friends that I understood them. It was surprising to them all that a brute displayed such intelligence!

Daily now I saw my fellow creatures engaged in their household duties for the Soarers. Some, equipped with tiny scraping instruments, would spend hours in polishing the beaks and claws of their masters. Others would brush their wings or backs, or keep their tail feathers neatly clipped. Still others would bathe and wash their captors, prepare their food, or wait on the young.

A chosen few, in whose families the lore of our own race had been preserved, were set apart to teach the birds the inventions of the Crawlers. These it was who had instructed the Soarers in the use of electricity, made them understand the radio and introduced sundry other civilized devices, for which they received no credit at all.

Owing to the part I played in amusing Cluck-Clux, I was not required to perform any other service. But after a few weeks a change was to come.

One day my mistress, whose protestations of affection were never-ending, and who had mauled and bruised every part of my body in her fervent embraces, decided to see how far she could stretch my tail. Accordingly, she seized me with one hand, and began to pull with the other. When I shrieked in agony, she roared with laughter and pulled all the harder, much to the delight of several other urchins.

Half-maddened with pain, I was hardly aware of what I did. But when a featherless under-portion of her wing presented itself in contact with my face, my teeth slashed out in response to some deep primitive instinct.

THEN how Cluck-Clux screamed! How swiftly she dropped me! In what a chorus the other birds howled! Little wonder that several grown-ups came rushing from the side-tunnels, while Cluck-Clux, flapping her injured wing ferociously, leaped toward me with vindictive darts and pecks, and I only saved my life by putting myself behind the protection of one of the larger birds.

"He bit me! He bit me!" Cluck-Clux wailed, amid spasms of tears. "I was playing with him nicely, and he bit me!"

"She was playing with him nicely, and he bit her!" coincided the other young witnesses. "The bad, bad animal!"

"The bad, wicked animal!" echoed Cluck-Clux, still trying to reach me with her beak. "You can take him! I won't play with him any more! I don't want him!"

Furious at such unfair treatment, I started to protest my innocence. But I should have known better than to plead my case in a court of my enemies! No one would even listen. I stood condemned, beyond hope of appeal!

"Silence there!" croaked one of the elder birds. He jerked me up into his arms and carried me away into the depths of the cavern, where he chained me carefully in a noisome corner.

CHAPTER III

The Incubator

NEVER shall I forget that place! Dank and ill-smelling, almost without light, and damp with the dripping of continual water. There, with heavy iron bands digging into my neck and ankles, I was confined within an area little wider than my body.

It seemed a long while later when I heard voices in one of the passageways. Straining my ears, I listened. Two Soarers were in conversation on a subject that made me clutch at my chains, and tremble. Was it that they were not aware that I was within hearing distance? Or did they imagine that I could not understand?

"This is what I have always said," stated the first voice, a sonorous bass. "It is not safe to let children play with the treacherous beasts. You can never tell when they will bite the wing that shelters them."

"Only too true!" admitted the second, in sharper, shriller tones. "Still, what is to be done? The children so love to play with the stupid little things! Of course, there was no excuse for that brat's biting poor Cluck-Clux."

"Vicious, wasn't it? But the question is, what are we to do with him? He's such a young and likely looking beast, it would be a pity to send him to the Butchery!"

"No, there's always time for that," agreed the second speaker.

Crouching flat against the rock in my moist, dark retreat, I remembered with horror that the Butchery had been spoken of as a place to which old and infirm Crawlers were sent. There they were dismembered, embalmed in metal boxes, and distributed as food to Soarers throughout the world.

"But if not the Butchery, then what?" rumbled the first voice. "After all, is it worth trying to do anything with an animal of such debased instincts?"

There was much more that was said. But I, writhing in terror, was scarcely in a frame of mind to follow the discussion.

For a long, long time I tossed and moaned on the floor, muttering curses, and tormented with pictures of the Butchery, where I saw myself lying with slashed throat and bloody limbs.

I was nearly in a fainting condition when at length one of the birds called for me, untied my chains, and without a word carried me away through one of the many long dark galleries.

Nor was my terror relieved when, after a few minutes, we came out into a sunlit grotto and I was clamped down in an iron machine that held me like a vise. What new barbarity was this? From adjoining grottos I thought I could hear the screams and yells of my fellow Crawlers—and it seemed to me that my last moment was at hand when my persecutor took out a scissorslike instrument and swung it down toward my head.

Held too firmly to resist, I could only open my mouth in a long-drawn bellow. But the great bird, as if not even hearing me, applied the shears to my head in a series of rapid clipping operations. For the moment, I was so crazed with alarm as scarcely to realize what he was doing, but after a time it came to me that he was merely clipping off the spinelike bristles that grew on my head.

These, I observed, he hastily gathered from the floor and put into a bag hanging at his side. But the purpose of this queer performance remained a mystery to me until many days afterward, when I learned that all Crawlers were clipped at regular intervals, since their bristles were valued for use in brooms, tooth-brushes, and other household appliances.

AFTER being left as bald as a new-born babe, I was once more carried away through long caverns and galleries—this time, I imagined, surely to the Butchery! But no! I was brought into an enormous, dimly lighted chamber, bearing the general appearance of a storage room, and so pleasantly warm as to remind me of

my lost jungle home. Arranged at regular intervals in neat rows on the floor were dozens of green-speckled round white objects, each from three to four feet in diameter, and each decorated with some peculiar marking in the hieroglyphics of the Soarers.

"This is the public incubator," explained the bird who had carried me in. "Chicks are hatched here by scientific methods, at a uniform scientific temperature."

And he added that all of the green-speckled objects were eggs; and that each was inscribed with the name of its parents, in order to avoid mistakes of identity. My sole duty henceforth would be to remain in the incubator, noting whenever any scraping sound was heard from inside any of the eggs, and giving notice by calling through a tube to a hatching assistant.

It seemed to me that I had now reached the lowest level of existence. But though I had no taste for my new employment, I resigned myself to it, and for three months never saw the outside of the incubator. I was fed regularly, slept regularly, and became sluggish of disposition and weak of muscle.

Until the end of my days I might have dwelt in the incubator, had I not grown careless. One day, after a hearty meal, I had fallen into a pleasant nap, from which I was aroused by the sound of something cracking. Well for me that I awoke! A young Soarer was breaking its way out of the shell!

The savage little creature, scarcely larger than an ostrich, was eyeing me hungrily. Knowing that Soarers are hatched with well developed legs, I was panic-stricken. Forgetting the tube down which I should have called for help, I took to my heels while the young bird flapped long, gawky, flightless wings and followed with fiendish squawks.

Had I not grown flabby, I should easily have outdistanced my pursuer. But so weak and undersized were my limbs that I could barely keep ahead of the outstretched beak, which was thrust forth like an eagle's to dig into my flesh.

Round and round the chamber I rushed, banging against the eggs in my terror, cracking some, upsetting others, knocking the signs off still others. But in the end all my efforts might have been of no avail, had the commotion of the chase not made itself heard through the incubator wall.

To my relief, the door burst open, and in rushed three full-grown Soarers. Seeing what was amiss, one of them dashed to the screaming babe and took it beneath a pacifying wing, while the other two ran excitedly from egg to egg. At the sight of each new crack in the shells, they let out loud wails, and when they saw how the signs had been displaced, they moaned like souls in agony.

One of them, with vindictive frenzy, made a swoop toward me and would have disemboweled me had another not interposed. Cowering in a sheltered spot between two eggs, I tried to keep as well hidden as possible.

But after awhile their confusion and anger seemed to be dying down.

"WELL," cackled one of the birds, "it's not as bad as might be. Seven eggs cracked, but we'll order some cementers and plasterers to seal them up so that no one can notice. If the infants should be deformed or die, I'll describe that as an act of God."

"Naturally!" approved another. "By the heavenly roost, who would dare question the word of hatchery experts?"

"Yes, but how about those disarranged signs?" put in a third voice. "There are thirteen in all. How readjust them so that each parent gets his own child?"

"Why must each parent get his own child?" shrilled another, in contemptuous reply. "Isn't it enough if each parent thinks he gets his own child? Here! We'll put the signs back in any old order. No one will ever be the wiser."

There ensued a moment's silence, during which the identifying mark-

ings were being replaced according to the last speaker's suggestion. Then, in low tones, someone inquired:

"Now, last of all, what about this wretched Crawler, the cause of all the damage? Of course, we can't keep him here any longer. Shall it be the Butchery at once? Or the tanning factory?"

At these words, I shuddered, and tried to make myself as small and inconspicuous as possible, for the tanning factory was the place where the hides of useless animals were converted into leather and glue.

"Not yet!" ruminated another. "No, not yet! He's not old or tough enough. But they need Crawlers down in the Uutra-W Radium Works. The radiation there kills the beasts off like worms, which solves the unemployment problem. The average life down there isn't five *terui.*"

Is it any wonder if I groaned at this information? By the Earthly way of reckoning, five *terui* are less than three years.

CHAPTER IV

Escape Through the Void

AFTER being chained to a rock for a day, while my fate was under debate, I was sent down to the Radium Works. My new place of employment consisted of a group of mines, connecting foundries and mills which had been developed under the supervision of my own race, according to principles worked out before our conquest by the Soarers.

The object of the Ultra-W Radium Works—or the Slow-Death Factory, as it was known to its thousands of toilers—was to turn out a certain radio-active substance known as Nearsight, which was found in limited quantities in certain volcanic strata. This Nearsight, which contained several potent compounds, consisting of radium, osmium, iridium, platinum and certain rare salts, had one quality which distinguished it from all other radio-active substances. When applied to optical lenses it made visible many of the rays ordinarily hidden in the ultra-violet region of the spectrum. As a result, the observer could behold colors otherwise undiscernible, and would find the aspect of the whole world improved—somewhat as when a color-blind man is given normal vision!

While no practical advantage had ever been observed from Nearsight, one can imagine how eager the world had been to make use of it! Even before our conquest by the Soarers, thousands had died each year for its sake. Now the Soarers had vastly expanded its field of production.

Unfortunately, even after the most strenuous efforts, Nearsight could only be obtained in minute quantities. One hundred thousand men, laboring for two *terui,* or more than thirteen months, might under favorable conditions turn out enough of the substance to be held on one's fingertip. And this, if used efficiently, might supply half a dozen pairs of spectacles with ultra-violet vision.

Under such conditions, of course, only the very well-to-do could enjoy the advantages of Nearsight. It has been estimated that not more than fifty new Soarers each *terui* could afford the luxury, while for each of these fifty, seven thousand Crawlers had to lay down their lives.

One may, accordingly, imagine the consequences of any carelessness among the possessors. Many of my race were condemned every time one of the lords misplaced or broke a pair of spectacles, or desired a new one with a different sort of ear-rim or nose-arch in order to keep up with the styles.

But not all these facts were known to me when I entered the Radium Works. Indeed, they were carefully concealed, and I learned them only from the whispers of my companions. For the man caught telling the truth about the Works was liable to death.

An ironic smile came to my lips now when I recalled that I had thought myself in the depths of degradation in the hatchery. How much more miserable was my new employment!

Confined far underground, I drudged on a twelve-hour shift, by the uncanny light of a radium lamp. It was my duty to tear the rock from the narrow tunnel wall by means of a pickaxe, to grind it to fragments with the aid of a heavy steel pounder, and carefully to search the fragments for a trace of Nearsight ore, which would reveal itself by a peculiar greenish glow.

Yet, during my several months in the mines, I did not find any trace at all of Nearsight ore. This did not surprise me, for not one worker in a hundred ever found any.

HOWEVER, I still clung to my miserable shred of existence, and valued it most when it was most imperiled. You will realize this from my actions when, after a few months, I came into conflict with authority. One day, when my lungs ached from lack of fresh air and my shoulders wearied of the pickaxe, I permitted myself a moment of careless complaint.

"By the wings of all Soarers," I murmured to the companion at my left, "I am getting tired of this! I can't stand this slavery much longer!"

The companion to my left grunted and, with a warning gesture, motioned me to look behind my shoulder.

There stood another Crawler, his breast decorated with a brass badge in the image of a fanged serpent, his face distorted with a malicious leer! At once I recognized him as one of those officials known by the honorary title of "Buzzard"—a member of the Soarers' detective force, for some of our race had fallen so low as to spy upon their own kindred!

For a moment the Buzzard glared at me without a word.

"So!" he ejaculated, with a particularly displeasing nasal whine. "You can't stand it here any longer! By all good Soarers, can I have heard correctly?"

Weighed down by the sense of my peril, I said nothing.

"You stand self-condemned!" shouted the official, bitingly. "You have been guilty of dissatisfaction!"

Although half beside myself with fear, I knew enough to remain silent, since anything I said might be used against me.

"Dissatisfaction is one of the gravest offenses," he lectured me, with a frown. "It destroys morale. If it goes far enough, it may even lead to a revolt. The dissatisfied man is a traitor to his country. I am sorry to have to report you—but the law must be obeyed!"

Clashing his heels together in military fashion, the Buzzard turned. Casting me a malevolent glance from his birdlike little red eyes, he went clattering away down the corridor.

For a moment I remained petrified.

Then the companion to my left, turning to me with horror-distended eyes, muttered a furtive warning:

"Quick! Run! Run, while there's a chance!"

I needed no other prompting. Without even taking time to thank my adviser, I dropped my pickaxe and raced along the gallery. My head was in a whirl. I did not know where I was going. But terror drove me like a whip.

In a crazy, blundering fashion, I rushed along tunnel after tunnel, while bands of startled laborers stared after me, and always I fancied I could hear some imperious voice calling upon me to halt. At length, regaining some trace of my senses, I began to move more cautiously, and chose the darkest, least frequented tunnels. Gradually, with a hopeless, sinking sensation, I came to realize the grimness of my plight, and foresaw that amid these closely guarded corridors I must eventually surrender and be captured.

The fateful moment came even sooner than I had anticipated. Creeping around a turn in a passageway, I found myself at an intersection guarded by two Soarers. Immediately I knew that all was lost. I took one rapid step backward, in the futile effort to flee—but already iron claws were about me! Dragging me into the light, my captor stared at me for a long while with cruel golden eyes, then laughed brutally.

"ANOTHER fugitive! As if any one could ever escape! By my tail feathers! What shall we do with him?"

Both birds joined in a blustering laughter. But the second eyed me long and greedily before replying.

"After all," he mused, "maybe we'd better not give him up. We need another Crawler as servant, and how are we to get him? Any regular worker that we seized might be traced."

"True!" agreed the first bird. "Very true!"

Speaking in whispers, they held a conversation of which I could catch not one word, though I strained my ears to the utmost. At last, to judge by the satisfied way in which they shook their heads, they reached a decision.

"Crawler," one of them exclaimed, "we will give you a chance for your life! If you choose, you may fly with us through space to some foreign planet."

"Fly through space?" I gasped. "Foreign planet?"

"Yes, Crawler, foreign planet! One of your race, who displays more intelligence than one would expect of the species, has devised a space-car. It operates on the principle of light-propulsion."

"What's that?"

The Soarer eyed me critically. Then, with slow emphasis, he expounded.

"The principle is simple, though doubtless beyond you. There are an inconceivably vast number of light rays or particles pervading space. Each has a propelling power—exceedingly slight, yet great enough on the whole to blow clouds of meteoric dust through the void. Now no practical use has yet been made of this power, because it has never been concentrated. But we have built a machine of lenses and electro-magnets, which brings wide areas of the stellar rays within the focus of a few square inches, and so gives us a motive-power to drive a space-car.

"Unfortunately, our flight has been officially forbidden, it being estimated that we have about one chance in five hundred to return alive. Tomorrow morning, just before daybreak, we set off secretly. Do you want to come along as our servant?"

The bird came to a shrieking close, and stood glaring at me with glittering eyes and outthrust beak.

"We give you your own free choice!" he rumbled. "Will you come quietly—or shall we turn you over to the authorities?"

I shivered, and almost collapsed. But the burning golden eyes were savage and relentless.

"I—I will go," I managed to gasp, and fell swooning to the floor. . . .

ACCOMPANIED by the two Soarers and three fellow Crawlers, I set out early the following morning in a space ship barely large enough to contain us all. For five *terui* we cruised through vacancy, stopping at various planets and satellites, and finally venturing out across the void of twenty thousand billion miles that separates Alpha Centauri from your own Sun.

Twenty-three *terui* were occupied in the passage, and meanwhile one of the Soarers and the three other Crawlers died and furnished the survivors with the means of sustaining life. Finally, reaching the Solar System, we picked the planet most like our own. Choosing at random, we alighted on one of the Andaman Islands, whose isolated location appealed to my companion.

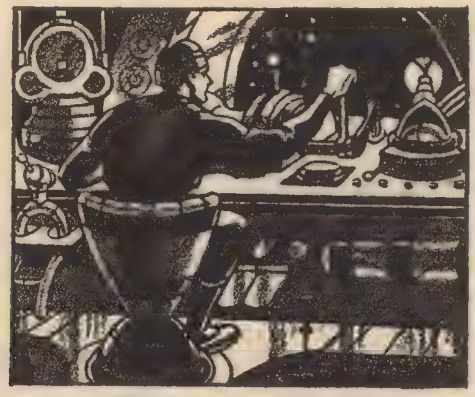
For some time he managed to live off the animals and human natives, while I dined on herbs and fish, until he was frightened away by an approaching vessel, which discharged a gun in his direction. All Soarers regard the sound of firearms with superstitious terror, since it reminds them of the deadly wars once raged by our own race.

In his terror, my comrade evidently forgot me. He did not return, and no doubt the space ship is now billions of miles on its way back to Alpha Centauri.

For my own part, I perceive that I must end my days on this planet. I had hardly arrived when I began to

wheeze and cough, and realized that I was suffering from a serious pulmonary complaint, due, I believe, to the relative scarcity of oxygen in the Earth's atmosphere.

It will not be long now before I will lie down in some cave by the sea and end my sufferings forever. But I will die happily, glad to have escaped from the pits of Xenern to a free and beautiful world, where there are no Public Incubators, no Radium Works, and, above all, no Soarers to persecute my poor, long-suffering species.



PLANET OF ETERNAL NIGHT

A Complete Novel of Man's Last Outpost

By JOHN W. CAMPBELL, JR.

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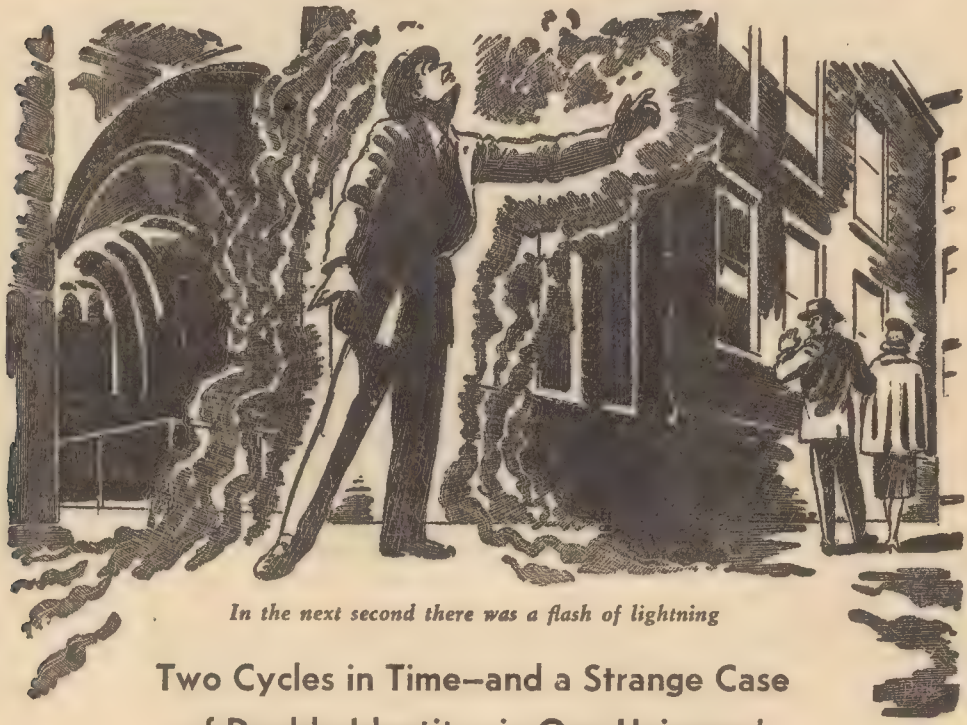
in the Next Issue

THE TIME TWIN



In the next second there was a flash of lightning

Two Cycles in Time—and a Strange Case of Double Identity—in One Universe!

By LYLE D. GUNN

Author of "The Ghost of Sleepy Dale," "Land of Hope," etc.

I STOPPED short on the threshold of the living room, for it seemed that a large, full-length mirror must have been placed in the doorway. A perfect reflection of myself confronted me. Yet I could see that *there was no mirror.*

I saw my face, plain of features, and topped by my straight and prematurely thinning black hair. I saw my broad shoulders (of which I am somewhat proud) and my blue, double-breasted suit. Of the suit there could be no doubt. I would recognize it anywhere. It was the only one I owned.

I raised my eyebrows, wrinkling my forehead—a habit I have when, as a serious instructor of astrophysics, I am puzzled by a fact which appears true but inexplicable. My *vis-à-vis* did likewise.

I felt annoyance at being mocked; yet, as a creature of reason, I had to admit that this other person had the same right to be puzzled as I. I think it is to my credit that, even at the initiation of the remarkable adventure, I did not once consider the possibility that I could be suffering from an hallucination.

"Who are you?" I asked, quite calmly.

I was less calm after the reply, uttered in a voice the exact counterpart of mine.

"Harry Steffens," said my double.

"Impossible!" I exclaimed. "*I* am

Harry Steffens."

"Nevertheless, that is my name," said the other flatly.

"But," I said with rising excitement, "I don't understand the meaning of this. Who are you? And who am I? Or, who are *we?* We look alike, speak alike, and have the same name. And that suit, there's only *one* like it. . . ."

"Oh, come now," said my double in the same tone I use when impatient with a dull student in one of my classes at the University, "it's not so difficult as all that. We are the *same* Henry Steffens! Or, you might say, we are fourth dimensional twins!"

STRANGELY, all my excitement left me then. I was once more the matter-of-fact scientist. I tried to marshal my thoughts.

"It won't do. We can't—" I began.

The other Harry Steffens interrupted rudely. Completely misunderstanding my objection, he declared impatiently, "You know that time is a dimension, that like the other dimensions it has direction. Why can't you grasp that the whole sidereal Universe exists simultaneously at many different points in this fourth dimension?

"Look!" he swept on, giving me no chance to speak. "The world lives and dies, then repeats the process in another cycle. The Universe runs down, its molecular structure crumbles, and the basic building materials, the atoms, are distributed through space. Then there is combination again into nebulæ, condensation resulting in the formation of suns, throwing off of planets, emergence of life, evolution, and so on until each cycle is completed after countless millions of years. Yet all the cycles occur simultaneously at different *places* in time!"

"Yes," I said, "but—"

"I know! I know! You are going to tell me of the incalculable possible combinations of the number of atoms—let us say 10^{27}—in a human body alone. And of the incredibly slight chance of an individual being duplicated, let alone the coincidence of two worlds with identical inhabitants and patterns of events. But you forget one thing: *the number of combinations that will occur in eternity is infinite.* And coincidence then is not a matter of chance—but a certainty!"

"I have forgotten nothing," I said when I was sure he had finished. "I am well aware of all you say, but it does not answer my one objection. How could you and I, if we were earlier and later concourses of the *same* atoms, ever exist together at the same place in time?"

"I can't explain it," he said, "but it's enough for me that I'm here—or anywhere—at all! Two hours ago, at just two o'clock, I was in the Loop, walking across Lake Street toward Wabash. It was storming badly. As I passed the power station, east of State Street, there was a blinding flash of lightning. Then came a far greater flash, a pungent smell, a powerful rushing of air, and—"

"And what?" I asked.

"Nothing!" he replied. "I opened my eyes. I was lying on the living room couch. I heard a sound, got up to see who was in my apartment, and came face to face with you."

"*Your* apartment!" I echoed. "Well, of all the consummate impudence! *I* live here."

"*We* live here," he corrected me sharply. "I have as much right to be here as you. An accident has shifted my position in the time frame of the Universe, but in my world I lived in this place, and since I am the same person and it is the same place, I still do! You keep forgetting that I, too, am Harry Steffens. To all practical purposes we are the same person—and I intend to maintain my rights!"

That was my first inkling of the trouble that was to come. . . .

UNEASILY I watched this person who was by all evidence identical with myself, and in the back of my mind I was still struggling to reconcile with physical law the fact that we were able to face each other as separate individuals. But it is no wonder that I failed to pick up the clue so

close at hand, for I was preoccupied with the practical problems that arose out of his being here.

There was only one job and one salary, and it was little enough for me to live on. How well I knew that. Otherwise Mary and I—Good God! The thought flashed through my mind that this other Harry Steffens, in his own cycle, must have loved a Mary Hudson who was the same person as my Mary. Would he expect— I was afraid to ask him, decided it was better to say nothing unless he did. Then, I told myself, I would indeed be firm!

As to the problem of the consternation that would be caused if we both appeared publicly at one time, that could wait. This was Saturday afternoon, and the rest of the week-end I would be working at home on a monograph. I had just returned from a trip to the library for a book I needed on radius vectors, and—suddenly I remembered something.

"Didn't you say," I asked my double, "that there was a bad storm just two hours ago?"

"Yes. Why?" he replied.

I answered him sharply, because I believed I detected a flaw in the story he had told me.

"Because I was on the way back from the library at that time, and it did not rain!"

"You're crazy," he said shortly.

I was highly provoked.

"Do you," I half shouted, "mean to stand there and tell me, a trained observer of physical phenomena, that I can't tell whether or not it's raining?"

"You're crazy," my double repeated, fully as excited as I, "because the library isn't open today. This, in case you've been asleep, is Sunday, May ninth, nineteen-hundred thirty-eight."

"It is not, and I'll prove it to you," I said triumphantly. "Look at this paper I just bought."

I took the folded paper from my coat pocket, unfurled it, and pointed to the date line—*Saturday*, May 8, 1938." "Now are you satis—"

"Wait!" he said suddenly, and, taking the paper from my hand, began to study it intently.

I looked over his shoulder and saw what he was staring at. I had hardly paid any attention to it before, since I have no interest in horse racing nor money to gamble on it. But now, because it was the object of my double's examination, I read the headline stretched in big black type across all eight columns of the newspaper. It said:

SON OF VICTORY FAVORED IN DERBY TODAY

My fourth dimensional twin turned his eyes from the paper and looked me full in the face. When he spoke, it was with deep seriousness. I was sure of that—why shouldn't I be? I know how *I* speak when I am completely in earnest. So it was with a quiver of excitement that I heard his words.

His eyes holding mine, he slowly said: "*Son of Victory* didn't win the Kentucky Derby. *Polly's Boy* won—and paid eighty-four dollars!"

IMPRACTICAL I may be, but not a fool. If this were true, it could mean a lot to me. Money, unfortunately, is important even to a scientist, especially if he wants a wife and a home.

"Let's sit down and get this straightened out," I said.

"Well," said my double, when we were seated, "in the first place it *is* Sunday, May ninth . . . Now wait!" he exclaimed as I began to protest, "I grant you that at this moment in the time frame we are within, it is Saturday, the eighth. But a little over two hours ago, before I was torn from my cycle, it was a day later. Either the superficial time factor in the two cycles does not correspond exactly, or the accident that shifted me from one to the other failed to bring me to the identical point. In any case, I have already lived the next twenty-two hours according to your chronology—and we must capitalize on that fact."

I was glad that we were of the same mind, though, I said to myself, we should have been, since we were the same person.

"What," I asked, "do we do first?"

My double thought a moment.

"Let's start by betting that *Polly's Boy* will win or—" he laughed— "or *did* win the Derby this afternoon."

I confessed that I didn't even know how to go about placing a bet, never having indulged before, and my fourth dimnesional twin reminded me that his experience was the same as mine.

"How about calling Powers and asking him?" he suggested.

Bill Powers was one of the younger men in the English Department. He had been a reporter for a while before turning to academic work, and knew his way around. As I went to the phone to call him, I could not shake off the peculiar feeling the other Harry Steffens had given me by the suggestion. It again reminded me that everything that had happened to me had also happened to him—we shared every bit of knowledge, every experience.

Powers answered his phone. He was obviously surprised when he learned what I wanted, but said he'd place a bet for me. I told him to play *Polly's Boy* to win, and then he really was surprised.

"If you want to throw your money away, however, it's all right with me," he said. "How much goes?"

I asked him to hold on and turned to my double. He was looking through a book, making notations on the margins of pages, and I couldn't attract his attention without addressing him.

"Harry," I said, and no one in the world will ever know what a queer feeling it gave me to use my own name in speaking to this person who was in all respects myself, "how much money have you?"

He looked through his pocket and said he had three dollars. I had seven dollars, so I told Powers to bet ten. That shows how impractical scientists can be; on a gamble one of course risks no more than he can pay if he loses, but we knew we were going to win.

But at the time the thought never entered my mind. Powers called back soon after to say he had placed our bet. I turned on the radio and sat down with my fourth dimensional twin to wait for the broadcast of the Derby. We had quite some time to kill, so we talked a bit.

I discovered two facts. One was that my double knew a little more about our special field of study than I. He mentioned a few books I had never heard of and which, so far as I knew, did not exist. I concluded that there must be some slight variation in the patterns of our two cycles. That thought gave me an uneasy moment. Perhaps, in this cycle, the Derby would turn out differently.

The other fact was that my double differed from me in personality. I am sensitive and warm-hearted. He seemed hard and cold. A shadow gradually crept over my mind, for somehow this discovery about the other Harry Steffens seemed linked with Mary. . . .

Complete Novel in the Next Issue:
PLANET OF ETERNAL NIGHT
By JOHN W. CAMPBELL, JR.

AFTER an almost interminable account of the weather, the track and grounds at Churchill Downs, spectators of prominence, and the horses entered, the Derby began. I wish I could retell that contest. How *Son of Victory* jumped into an early lead, how the jockey on *Polly's Boy* tried to bring his mount up to challenge, and was sharply cut off on the back turn. I was amazed that I, a serious student, could become so excited over a sporting event. I heard myself calling encouragement, cheering until I was almost hoarse. My double, on the other hand, was quite unemotional about it. *Polly's Boy*, he said, had won yesterday—by two lengths.

But the finish, that was almost unbelievable. Near the end of the race —at the furlough pole, I think it is called—*Son of Victory* still led, but another horse was coming up so fast on the inside that the announcer could not identify it immediately.

Then he called it—*Polly's Boy!* Another few strides and the two horses were neck and neck. They flashed over the line so close together that the announcer said it was a "photograph finish" and that the placing would have to be held up until the electric camera's picture was developed.

My fourth dimensional twin for the first time seemed disturbed. I could see that he had the same thought that had come to me. He had said that *Polly's Boy,* in the Kentcky Derby in his cycle, had won by two lengths. Yet no more than two inches could have separated the horses in the race we had just listened to. Obviously here was another example of how events in the two cycles sometimes failed to correspond exactly. And if that was true, perhaps *Polly's Boy* had not won just now.

Our doubts were resolved a moment later. The picture showed *Polly's Boy* the winner by a nose. At 41 to 1, we had won $410.

THE first excitement over, I began to regret that we had not bet more. But there was still sufficient opportunity to increase our profits, for my fourth dimensional twin would know everything important that had happened up to two o'clock tomorrow afternoon. I would talk to him about that after supper.

Supper, of course, was a problem, because we could not go out together. So I went first, stopping on the way back at Bill Powers' to collect the winnings. Back home, I split the money with my double. Then I mentioned the subject of further exploitation of his knowledge of the immediate future.

A surprise awaited me. After a moment's hesitation the other Harry Steffens spoke, clipping his words unpleasantly.

"Somehow I can't think of anything else that you'd be interested in."

Then he went out, leaving me, I must admit, somewhat disturbed. Thinking of the growing peculiarity, almost menace, of his conduct, I had trouble concentrating on the monograph I was writing. I hardly noticed the passage of time until, looking up from a calculation I was struggling with, I saw it was eleven o'clock. Where was the other Harry Steffens?

An hour later he returned. Without any explanation for his failure to come back after supper, he came to the desk and looked over my shoulder at the problem that had been giving me so much difficulty. Suddenly he grunted, plucked the pencil from my fingers, and began writing rapidly. In three minutes he had solved the problem, using a formula with which I was totally unfamiliar. Then, without a word, he went into the bedroom.

I was furious. Not at my double's superior knowledge. If the cycle he had come from was somehow slightly superior to mine at corresponding periods of their history, I had no cause for shame because he had had greater opportunity for knowledge.

But I was furious—and frightened —because when the other Harry Steffens had leaned over the desk, I had seen a smudge of powder on his coat lapel. And, unless I was very mistaken, the delicate scent of that powder was the distinctive one used by my sweetheart, Mary Hudson!

MY double had taken the only bed, so I had to sleep on the living room couch. Sleep, did I say? I tossed for hours, torturing myself with fears, wondering what to do in this incredible situation. Then I did something I could never have done under any other circumstances. I got up, stole quietly into the bedroom where my fourth dimensional twin lay asleep, and methodically went through his trousers.

I had suspected from his manner that he was double-dealing with me, that he was continuing to capitalize on his unique knowledge of the future without including me in the profits. I

was right. In one pocket I found the three dollars he had had before. In the other I found a thick, tight roll of bills. A quick flash through it showed that there was at least four thousand dollars!

I replaced it and went back to the couch to think. I was exhausted from the excitement of the day and the worry of the evening. The last thought I had before dropping off to sleep, was that in the morning there would have to be a showdown.

I woke with a start. The apartment was very quiet but the sun was streaming in and for some reason it felt late. I found my watch. It was nearly one o'clock.

I strode into the bedroom. It was empty! My fourth dimensional twin was gone! Even before I went back to where I had left my clothes I knew what I would find. The seven dollars in my trouser pocket was still there, but my wallet, which had had my share of our winnings in it, was empty.

I stood there recriminating myself for my lack of judgment in not taking the precautions my intuition had warned. I had sensed something sinister about the other Harry Steffens and—

A thought struck me with the force of a blow, and the shock swept away my lethargy. Seizing the phone I hurriedly asked for Mary's number. Her mother answered the phone.

"May I speak to Mary, Mrs. Hudson?" I said, striving for calmness.

Out of limbo her reply seemed to come: "Why, Harry, Mary already left to meet you."

"To meet me!" I exclaimed.

Mrs. Hudson's voice showed her surprise.

"Of course. Why, is anything wrong?"

I tried to be calm, because that was the only thing that could help now.

"No," I said, "but I—I've forgotten where I said we'd meet. Did Mary tell you?"

"Yes, Harry, but—"

"No buts, Mrs. Hudson. Where was it?"

"Downtown, at Wabash and Lake. You're to meet her at two. But you must let me say something else. Why did Mary take a suitcase with her?"

WHAT a fool I was! To let Mary fall into the hands of this scoundrel who was my double. And what an infernal villain he was! He had forced himself upon me, cheated me, and now God only knew what he had told Mary or intended to do with her.

I leaped into action. Not even replacing the telephone receiver, which I had dropped at the shock of Mrs. Hudson's information, I raced for my clothes, scrambled into them, and tore out of the apartment.

On 53rd Street I caught a cab. It was twenty after one. I should be downtown before two. I *had* to be—because if I weren't . . .

It lacked eight minutes of the hour when I climbed out of the cab at State and Lake. Intentionally I had come here, a block from where my fourth dimensional twin was to meet Mary. Probably, since he had left in plenty of time, he would come by street car.

I felt almost sure of it, because I knew that I, with the frugal habits of a lifetime, would have done so no matter how much money I had in my pocket. My double would get off the street car at this corner and I could catch him before he got to Mary.

It had begun to rain while I was in the cab. Now the storm was increasing in intensity. I pulled my coat collar up around my neck while I waited nervously, watching every street car that came. Lightning began to play through the sky. The center of the storm seemed very close, and moving toward me.

I wanted to intercept my double before he could get to Mary. I could have gone to her first, but explanations would have been difficult and he might have arrived in the interim. I hoped to spare Mary the ghastly knowledge of this strange freak of Fate.

But what if I could not head him off? How was I to stop him? Well, I thought savagely, he'd not ruin my life and Mary's—I'd kill him first—

Good God! What was I saying? I

could not kill him. Our lives were bound inextricably together. What happened to one must happen to the other.

I crossed to the north side of Lake St., and began walking hurriedly toward Wabash. The other way was better after all. I must reach Mary first, get her away somehow. There was a flash of lightning, and right on its heels a splitting crash of thunder. The center of the storm was directly overhead.

Suddenly I stopped. I hardly knew why, except that I had an impulse to see the time. I looked at my watch. It showed exactly two o'clock. The same impulse made me turn my head. Then my heart skipped a full beat and I knew of what my subconscious mind was trying to warn me.

I was standing directly in front of the power house!

THE inexorable hand of Destiny had drawn me to this fatal spot at the exact time when, in his cycle, the other Harry Steffens had been blasted into the fourth dimension.

I began to run, and even as I did, I choked with hysterical laughter. How could I hope to escape the immutable pattern of eternity by running on my human legs? The complicated chain of events that had brought me to this spot was alone proof of the fact that it was ordained that every Harry Steffens, in his cycle, must meet this fate, must be torn from his normal place in the time frame of infinity.

I felt a jarring impact that checked me in full stride. Had it come? Instinctively my hands shot out, and I felt a body, stumbling against me. I caught the figure, and then, my fear-blunted perceptions clearing, I saw that in my arms I held Mary.

"Oh, Harry," she said breathlessly, "I thought I saw you farther down the block, and was hurrying to meet you when we collided. How could I have been mistaken—"

At her words I turned my head. Half a black away I saw my fourth dimensional twin swinging toward us, his head bent against the downpour. He was just passing the power station.

Instantly I pulled Mary close to me, and buried her head against my shoulder. In the next second there was a brilliant flash of lightning and, cutting through the deafening crash of thunder that followed hard on it, another flash, so much greater in intensity that even with my head slightly averted a sharp pain stabbed at my eyes. . . .

When I could see again the power station was in flames and, where an instant before had been the other Harry Steffens, I now could just make out a tiny whirlpool of dust-laden air slowly settling down on the empty sidewalk.

IT was not until some time after the denouement of this remarkable adventure that I could again think of it with the dispassionate attitude of a scientist—and discover its still more remarkable explanation.

When I returned to my apartment that fateful Sunday, after taking Mary home in a cab—I told her no more than was necessary to account for the strangeness of those actions of my double which she thought mine—I noticed a peculiar circumstance.

With the two cab fares I had paid, I had three dollars left of the seven dollars with which I had started out. That was exactly the amount of money the other Harry Steffens had had when I first saw him the day before, the same day that in his cycle was Sunday, May ninth.

At this fresh evidence of the identical patterns in which our fates were woven, I began to wonder why he again had suffered the cosmic disruption which on its recurrence should have happened to me! That marred the immutable design of the Universe. Whatever befell him *must* happen to me, since we were the same person at different points in time.

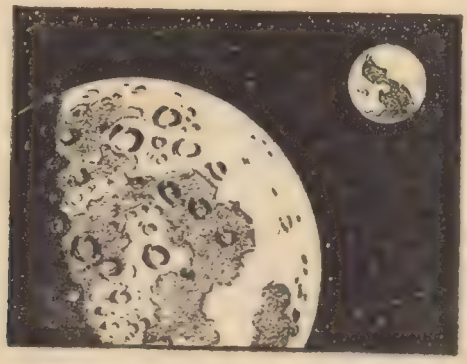
But we couldn't be, I remembered, because it would then have been impossible for us both to have occupied even for a moment the *same* point in time. There must be some other explanation that allowed a place in the pattern of this world for my fourth dimensional twin. Suddenly I had it!

Had the thing that had been lurking in my mind ever since my double had first used that figurative description of our relationship.

I was the survivor of a set of identical twins. The other infant had been still-born—and *there* was the place in this world, in this time frame, that was open to the other Harry Steffens. Not figuratively but literally he was my fourth dimensional twin!

In fairness, I must mention the debt I owe to him. Because of the new mathematical formula he showed me, and several illuminating notes I discovered in a text book he had scribbled in, my monograph attracted wide attention. To its success I owe my appointment to a full professorship, which made it possible for me to make Mary mine for life.

So I hold no rancor for my fourth dimensional twin. Whether the second electrical bombardment returned him to his own cycle or another, or reduced him to dust, I do not know. I only hope he is back in his proper time frame, and that there he has found his own Mary—and is as happy as I.



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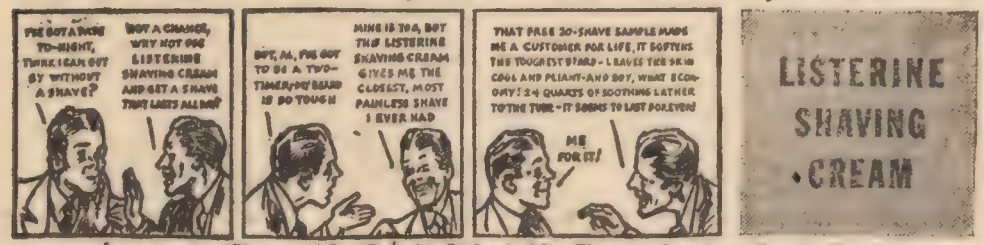
I'VE GOT A DATE TO-NIGHT, THINK I CAN GET BY WITHOUT A SHAVE?
BUT A CHANCE, WHY NOT USE LISTERINE SHAVING CREAM AND GET A SHAVE THAT LASTS ALL DAY
BUT, MA, I'VE GOT TO BE A TWO-TIMER—MY BEARD IS SO TOUGH
MINE IS TOO, BUT THIS LISTERINE SHAVING CREAM GIVES ME THE CLOSEST, MOST PAINLESS SHAVE I EVER HAD
THAT FREE 30-SHAVE SAMPLE MADE ME A CUSTOMER FOR LIFE. IT SOFTENS THE TOUGHEST BEARD - LEAVES THE SKIN COOL AND PLIANT-AND BOY, WHAT ECONOMY! 24 QUARTS OF SOOTHING LATHER TO THE TUBE - IT SEEMS TO LAST FOREVER!
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THE WARNING

Civilization's Dawn Left Humanity One Bequest—the Time Capsule!

The screen showed Earth being attacked by invaders from space

CHAPTER I

The Mysterious Signal

SETH JOHNSON looked at his cornfield, and that made him feel good. Even under the light of the May moon he could see he had a good field of corn, so good that a little celebration would be in order.

He walked away from the barn, glancing back at the house, and by the seventh fence post, he reached down and moved a piece of board lying there. He lifted the jug out of the hole, and the applejack gurgled down his lean throat. He felt a pleasant glow inside. Another wouldn't do him any harm. The applejack gurgled again.

That sure was a good field of corn,

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A Complete Novelet

By **ROBERT MOORE WILLIAMS**

Author of "The Man Who Looked Like Steinmetz," "Beyond That Curtain," etc.

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That sure was a good field of corn, he congratulated himself. Suddenly, out in the middle of the field, right before his eyes, a hill of dirt had suddenly humped up, as if some supermole had gone to work there. He blinked, and looked again. The bulge was ten feet high and still growing.

"Hey!" he shouted. "Hey! Get out of there!"

There was a soft, pushing explosion, a deep-throated *"Phut!"* The mole hill exploded. A soft rain of dirt fell over him. Out of the hole the explosion had made a cloud of smoke came twisting, boiling like a volcano. Then there was light, a solid column of intense light. It bored a hole up into the sky, then winked out. Before Seth could move it blinked on again, stabbing like a searchlight into the night-time sky.

"The old devil!" Seth whispered. He flung the jug away. At a dead lope he set out for the house.

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. He burst into the kitchen.

"Maw, the devil himself has broken loose down in our cornfield. He came a roarin' and a rampagin' right up from the fiery pit, blowin' smoke out of his mouth and fire out of his eyes. . . ."

SHE was already mad about something. "If it's not enough trouble to have the radio start blatting its fool head off right in the middle of my favorite program. . . ." She stopped, stared at him, her hands on her hips. Her voice went up a full octave. "Seth Johnson! You've been drinking again!"

He backed away from her. He might be master of the farm, but she ran the kitchen.

"Honest, Maw, I only had one little drink, and then my south forty humped itself up and the old devil popped right out of the middle of it."

Suddenly, as if to support Seth Johnson's story, the searchlight beam stabbed into the sky again. His wife jumped five feet high.

"Land's sake, Seth Johnson! What was that?" she screeched.

"It's just like I told you," came the answer. "The old devil has hopped up out of hell."

"You idiot!" The light went off, but the column of smoke was visible in the moonlight. "I'm going to do something! I'm going to call the sheriff."

Again the beam of light flamed skyward.

Viciously, Amanda cranked the handle of the rural telephone.

"Sheriff? This is Amanda Johnson. Somebody's trespassing here. They're making as much smoke as a million brushpiles burning at once, and they're flashing lights up into the sky. You get right out here, Sheriff, and arrest them for trespass."

"Madam," said the sheriff, at the other end of the wire. "Are you drunk?"

Painfully, he removed the receiver from his ear. It was still talking when he hung it up. He looked at his deputy.

"Bill," he said. "I reckon we better go out and see what's the matter with the Johnsons. Sounds to me like they're both drunk."

Bill grunted unenthusiastically, without looking up from the mimeographed sheets he was reading. He was studying, by correspondence, to be a G-man, and G-men don't have to spend their time answering every phone call. Bill had never seen a G-man, and wouldn't know one if he did see him, but he wanted to be one.

The sheriff and his deputy left. Before they returned, Bill had seen enough G-men to last him a lifetime.

MARK WHITING slipped silently up the stairs. He felt a little guilty, for, after all, he was the host, and for a host to pull a sneaker on his guests was not nice. Or was it? Marcia would say no. Really they were her guests, and he felt she should entertain them without his presence, but that didn't seem to be the way they did things in this society that was suddenly opening to them, now that money had come. Marcia got a big kick out of society, but all Mark got out of it was an equally big bore.

Those people downstairs—to him they represented the false aristocracy of hereditary wealth, and he was not at home with them. If they had represented the aristocracy of achievement—that would have been different. In all the land there was no man more at home with men who did things than Mark Whiting. Already legends were growing around him. Not that he had amassed a fortune. He had acquired a fortune, but that was only incidental. He had done things. One of those things was beam transmission of radio impulses. Because of that, airplanes rode safely through the darkest night, riding the Whiting beam. Another was radio control for airplanes—but the Army had that. There was a photo-electric cell that bore his name.

In all, there were some eighty-odd patents down in Washington issued to Mark Whiting. Of recent years they had been fewer. He had been doing atomic research, and the things you discover there, you don't patent.

Some of them you don't even admit you have discovered.

He slipped silently to the third floor, unlocked the single door.

Downstairs they were getting ready to play a game called bridge. So he slipped away to the third floor, hoping Marcia wouldn't notice his absence.

He need not have slipped away. He wasn't destined to play any bridge that night. Or any night thereafter. Things were coming up that needed doing, and Mark Whiting was a man who did things.

He turned on the light. Instantly, he seemed a new man.

For a ham radio station, it was a marvel. Not that ham stations aren't usually marvels. They are — of ingenuity. There were four transmitters, two phone and two code, for the forty and eighty meter bands. There was a special experimental transmitter operating on a band that was next to no meters, and a special license for it. There were three receivers, two all-waves, and one for the band that was almost no meters.

There was a glow in his eyes as he looked at them, and the glow deepened as his eyes went to that odd assembly of apparatus sitting on a table all its own.

A bulky coil wound on a form that had once contained oatmeal, a sliding arm reaching down and making contact with the line where the insulation was rubbed from the coil. A galena detector, its cat whisker curving in an arc down to the crystal, a pair of cheap earphones. What a receiver that had been! For a transmitter, an automobile coil fitted with a tiny vibrator, a small carbon spark gap, with binding posts for hooking the aerial and ground to each side of the spark gap.

You could hear it a mile, maybe— he grinned—if the wind was right— and any receiver within that mile radius couldn't keep from hearing it, it was tuned so broadly.

The apparatus looked crude and clumsy. It was. It was a set that a kid would build, and it showed all the clumsy workmanship of a kid. Not like that gleaming monster over on the other side of the room, the transmitter that had been heard in Australia, the receivers that would get anything, anywhere.

Well, a kid had built it. He thought a minute. Back in 1918, when the war ban went off wireless, a fourteen-year-old kid had broken his arm, and had to lie in bed for a week. Among the magazines brought to him was a radio magazine, with a section in it that described this very equipment.

IN that magazine, Mark Whiting, in bed with a broken arm, had found his destiny. The trail that by June, 1939, had brought him to the position of one of the foremost scientists in the United States, had started there, and that coil of wire wound on a box that had once contained oatmeal, was the great-grandfather of those intricate coils in that receiver that operated on almost no meters.

Grinning, he looked at the apparatus. He could build better sets now, but to him there was something of destiny in that first one, as if some invisible, intangible potentiality lurked within that crude assembly of instruments. Even when he built that first set, he had sensed the hidden secrets it partly revealed. The years of improvement had revealed more of those secrets, but not all of them.

A deft hand reached out, slid the slider across the coil, gently patted it.

Then he remembered Marcia. Any minute now she would be looking for him to play bridge.

He turned back to the gleaming instruments, the product of his developing genius. He would listen for a few minutes to the gabbing of the hams. It always gave him a thrill to listen to a kid in California talking to a kid in Maine. Across three thousand miles their voices meeting— There was something mysterious about it, something that filled him with awe.

The tubes warmed. For an instant there was silence.

Then the blatt from the speaker was a raucous thing, a shrieking roar of sound that sent his hands to his ears.

Quickly he cut the volume, but the

roar still came through. He flipped the tuning dial, and on a receiver that tuned as sharp as a razor edge, the roar was untunable.

It cut off. He stared at the receiver. It came on again.

A regular series of dashes, mechanical in their even repetition, were flooding the ether. He swung the dial up to two hundred meters. The roar was there. He tried 600.

The roar was all over the dial. It was everywhere. Even with the volume turned to a minimum, it was uncomfortably loud.

It sounded like a giant walking over the ether lanes, and every time he put his foot down, every radio receiver in the land squawked.

Buzz—buzz—buzz— About as fast as the normal human heart. It sounded something like the beating of a heart, a radio heart.

Buzz—buzz—buzz— All over the dials.

SIDNEY DINGLE grabbed the telephone.

"Ten thousand dollars an hour I pay for time on the air. Another ten thousand them singers and jokers cost me. And what do I get? All I get is *buzz—buzz—buzz!* Will buzzes sell Inkie-Pinkie Candy bars? I ask you. Get me the president of this company . . . Get me the governor . . . Get me the president of the United States . . . Get me my money back. . . ."

"We're doing everything we can," the harassed assistant manager told him. "The disturbance is nationwide. Nothing like it has ever happened before. We're laying directional antennas on it. We've reported it to the Bureau of Commerce and they're laying lines on it. We'll have it stopped as quickly as we can. Yes sir, Mr. Dingle, you can rely on us."

The harassed assistant hung up.

"I hope you choke on your damned Inkie-Pinkie Candy bars!" he growled at the telephone.

It growled back at him. He grabbed it.

"Listen, lady, if you think you got trouble you ought to be where I am. Everybody in Chicago is calling this station, wanting to know why their radios won't work. Good bye. . . ."

He flung the phone back on its cradle. Then he grabbed the inter-office phone.

"Get me that chief engineer again . . . Jim, if you love me, can't you do something about this? Old Dingle is squawking his head off, and he pays us plenty. Haven't you got any idea of what's happening? Every set in this whole country is on the blink. We've got the makings of a first-class panic on our hands. Even the newspapers are yelping at us, as if we caused this. Haven't you got any ideas? . . . All right, I'll shut up and let you work. . . ." He wiped sweat from his forehead, took a deep breath, lifted the outside phone back on his desk, tried to explain to some excited man that the world was not coming to its end.

THIN against the south window there was a light in the sky. Mark Whiting went to the window.

Outside it was a calm May night, with a full moon. Outside there was something else.

There was a pillar of light in the sky. As he watched, it shot upward like a flaming arrow. It reached up—up—up—into the heavens, like a searchlight a thousand times more powerful than any known to man. Then it flicked off.

He watched. As the light went off, the buzz from his radio went off.

The light came again, flashed its intense beam up into the sky, and as it came on, the radio started squawking. While the light held, the buzz held. When it went, the buzz went. They were perfectly synchronized.

He watched the light, and the startled words sprang unbidden from his lips.

"I would have sworn that no light on Earth could be as powerful as that!" He was one of the few men with enough technical knowledge to know about such things.

Behind him, the phone extension yelped, jerking him out of his trance.

"Mr. Whiting? This is Morrison, editor of the *News-Journal*. We're

putting an extra on the streets and we would like a comment from you. You have probably heard the disturbance over the radio. Every radio set in this country is being blanked out by some mysterious signal. Direction-finders locate the disturbance at about one hundred miles south of Chicago, near the town of Melville. We have had the sheriff of that section on the phone, and he reports there is no radio station in that vicinity. He reports, however, that some farmer's cornfield blew up, a column of smoke boiled out of the ground, and an intense light started flashing. Although the light is almost a hundred miles south of us, if you look in that direction you can see the illumination. . . ."

"I've seen it," Whiting interrupted. "What do you want from me?"

"Apparently the light and the radio signals are coming from the same source. Nobody knows exactly what has happened. But it has been suggested that a space ship landed there. We would like to have you comment on it— What's that? . . . But you're a scientist, Mr. Whiting! You're supposed to know about such things . . . But we haven't any more definite information. We have a reporter and a photographer on their way to the airport now." The man at the other end paused for a moment.

"The highways are practically blocked," he resumed tensely. "Half the people in Chicago seem to be trying to get down there and see what happened. The people down there seem to be trying to get away . . . What's that? Hold our plane at the airport until you can join us? The suburb in which you live is not over two miles from the airport, is it? You'll give us a story if we give you a ride down there? . . . It's a deal."

Before he could get out of the room the telephone exploded again.

"Yes, this is Whiting. Governor? . . . I don't know what is happening, and I'm afraid to do any guessing. You've notified Washington and appealed for help? . . . Good. I agree with you that it's a job for a scientist. I'll do the best I can. I'm on my way right now. . . ."

Marcia stood in the door, looking reproachful.

"The guests—" she began.

"The devil with the guests," he said, brushing past her. Then, seeing the hurt look on her face, he paused and turned. "I'm sorry, dear. But something has happened. And if it's what I think it may be, there won't be any time left for anybody to play bridge tonight—or any other night."

He kissed her. He dashed down the stairs. The bridge players looked up at him as he dashed through the room and out the door. He heard some woman complaining because the radio wouldn't work.

CHAPTER II

Out of the Past

IT was long after midnight before the *News-Journal* extra hit the street, but the newsboys found plenty of buyers for their papers. It seemed the whole town was awake. Minutes later, New York was flooded with screaming newsboys who didn't have to look for customers or wait to make change. St. Louis, San Francisco, Paris, London, Rome . . . The newspapers reported an incredible story:

TIME CAPSULE FOUND IN CENTRAL ILLINOIS

Souvenir of Pre-Primitive Unknown Civilized Race

"10-20,000 Years Old" Says Mark Whiting

Marked by a flashing light, a column of smoke, and a radio signal that blanked every receiver in the country, a time capsule made its presence known in central Illinois last night. The device was found on the farm of Seth Johnson, near Melville, in Sappington County.

Johnson at once called officers to the scene. Thousands of curious from the surrounding country, attracted by the flashing light, surrounded the place. A company of National Guardsmen, located in Melville, was promptly called out to maintain order.

Not knowing the nature of the device, and fearful of its function, a call was put in for scientists to go to the scene, and Mark Whiting, scientific authority, went down in the special plane of the *News-Journal*. He im-

mediately set men to work excavating, and as this edition goes to press, they have just dug down to the top of the capsule.

It is buried twenty feet under the ground, constructed of rust-resistant metal. The size cannot be determined as yet, but it is at least thirty feet in diameter. The top of the capsule was blown off by an explosion. After the explosion, smoke poured from the hole in the ground and a brilliant light, set in the top of the capsule itself, started flashing.

Apparently the light, the smoke, and the radio signals were designed to call attention to the time capsule!

The unknown builders, whose race has perished from the Earth apparently took every precaution to make certain the capsule would be found at some pre-determined time in the future. Their purpose in building it is unknown. It has been suggested they left it as a warning to the races that would come after them.

Historically, the race of the builders is unknown. Myths and legends, surviving from pre-primitive times, indicate that a civilization may have existed on Earth prior to the present, but this is the first definite proof of their existence ever found.

In all probability, when the capsule is opened, information will be found revealing not only its purpose but what happened to the race who built it and buried it here in central Illinois. Mark Whiting suggests it was buried here because, geologically speaking, this is a very stable section of the world, almost completely free from earthquakes and upheavals of the earth crust. The various strata of the earth surrounding the capsule indicate that it is at least 10-20,000 years old.

The next edition of the *News-Journal* announced a second sensational story. It reported the finding of another capsule in Egypt, in the Nile delta north of the pyramids. . . .

SIDNEY DINGLE flung the paper aside.

"I spend twenty-thousand dollars putting Inkie-Pinkie Candy Bars on the air, and what happens? Time capsules start exploding all over the place. I want my money back. I want justice. I got a contract!" He grabbed the phone. He didn't get an answer.

Outside, in the streets near his home, newsboys were shouting another extra.

Dingle ran out of the door of his exclusive suburban home. "Boy! Boy! Give me one of those papers." As he read that edition he forgot all about Inkie-Pinkie Candy Bars. The newspaper told an amazing story. . . .

When the group of men led by Mark Whiting entered the top of the capsule through a door which they found there and pried open, the light, smoke, and radio signals ceased, the newspaper reported. A ladder led downward. Flashlight in hand, Mark Whiting went down the ladder. Apparently a weight on the ladder closed a hidden switch, for immediately a device similar to a motion picture projector went into action, flashing a series of scenes on a small screen.

The scenes showed that parts of North America, parts of Egypt, and parts of India had been colonized in prehistoric times by a people whose homeland was a group of islands located in the Pacific Ocean. A high civilization had been developed in those islands, when, about 15,000 years ago, Earth was attacked by invaders out of space.

The old civilization had succeeded in destroying the invading fleet, which did not originate in the Solar System, but on a planet circling Sirius. Before they were destroyed, the invaders loosed a germ among the old race, a germ that caused death by intense inflammation of the nasal passages and the lungs, a disease that survives today on Earth as the common cold, thousands of years conferring partial immunity. Dying, the old civilization constructed Time Capsules—buried them at different places so they would certainly be found—left them as their gift to any of the primitive races that might survive the disease raging among them, and begin the long climb to civilization.

Few traces remained of the old civilization, the paper observed, the cities they built in America having vanished utterly, their motherland sunken beneath the sea.

Mark Whiting, questioned as to why the Time Capsules were so designed that they would explode, refused to commit himself. After viewing a few of the scenes shown on the projector in the capsule, and examining some of the records, he, and the G-

men working in collaboration with him, excluded members of the press from the Time Capsule. They refused to disclose their reason for this action.

It is known, however, that high ranking officers of the U. S. Army are flying here in response to an urgent call from Mark Whiting.

Martial law has been declared over the whole county in which the Time Capsule was found.

Very few people got up the next morning. Very few had gone to bed.

IT was afternoon. Seth Johnson had crawled up into the hayloft to take a nap. He was worn out, and he needed the sleep. It was hard to sleep. Those confounded airplanes were making so much racket. They had turned his meadow into a landing field. He had tried to protest, but those officers had acted as if he didn't even own the farm. Martial law.

He went to sleep, muttering. A lean, hungry-looking photographer roused him out. He had seen that photographer the night before.

"Pictures of you, Seth. The editor says to get them. You want your picture in the paper, don't you? Come on down."

There were other photographers. There were reporters. They took pictures of Seth, whiskers and all.

"Twenty years I plowed that field," the farmer told them. "I never would have guessed there was such a thing buried there." He looked at the lean, hungry photographer. The man had been up all night and all day. How did he manage to keep going? Then Seth recognized the odor. He moved closer, whispered to the photographer.

"Sure," he was told. "Come right around behind the barn."

They threw the empty bottle at a man with enough braid on him to have been a general. With two aides, he was walking across the barn lot, moving from the landing field, where a trimotor job still buzzed angrily, toward a group out there by that pile of dirt in the cornfield. He was so preoccupied with his conversation with his aides that he didn't notice the bottle. And when a drunken farmer and a drunken photographer throw an empty bottle at a general, and he doesn't notice it, he's got his mind on important business indeed.

GENERAL WARSIN was gruff.

"Whiting, you're crazy." His aides stirred uneasily. The whole group stirred. The general had just arrived.

Whiting didn't smile. He looked tired as he answered.

"I hope so, General. And remember I'm not positive, can't be positive until we get those language experts here to crack that language. Fortunately, the old scientists made it easy for us, by arranging an illustrated lecture—the spoken word, the written word and the represented object all arranged side by side. They knew the savage races coming up would have a different language, but they made it easy for those savages to learn theirs."

Warsin grunted.

"Savage races?"

"We are the descendants of those savage races, General. When this capsule was buried, our ancestors were cracking marrow bones on the Asiatic highlands!"

"Hrrmph!" The general cleared his throat. "Never mind that. Why did you call me here? Aside from its historical interest, what does this capsule have to do with us?"

Whiting took a long breath.

"Because the same forces that destroyed the old civilization are menacing us."

"What?"

"The people who buried this capsule built into it a device to detect any space fleet that might approach earth. They designed it so, when any fleet did approach Earth—if another ever did—the capsule would blow off its top, start flashing lights, sending up smoke, and emitting radio signals. The radio would have been enough, but the old scientists could not, of course, anticipate that the savage races to come would have developed radio. Therefore—"

The general's face mirrored conflicting thoughts. This fellow Whiting was a civilian. In the eyes of the

general, that damned him. But, for a civilian, he had a reputation.

"You mean they built into the capsule a gadget that would detect, by radio, the approach of a space fleet?"

"No, not radio. Radio waves would not get through the Heaviside layer, or the various other layers of ionized gas in the atmosphere, the D layer and the Appleton layer. No. The device they used is a combination magnetic-gravitational detector. Gravitational lines of force pass unimpeded through the layers of ionized gas, so likewise do magnetic lines.

"The whole Solar System is in perfect magnetic-gravitational balance. A space fleet approaching Earth would cut those magnetic lines, generating a current just as the armature of a motor turning in a magnetic field generates a current; also disturbing the gravitational balance. Only very slightly, mind you; no instrument our science could devise would detect that disturbance. But their science had forgotten more than our science has yet learned."

THE general looked at the tired man facing him. His eyes went away from Whiting, went to the pile of dirt, went down into the pit and to the opening in the bottom of the pit. He looked at the corn.

"I don't believe it, Whiting. In effect you are saying this: That, since this time capsule has revealed itself, and the one in Egypt has revealed itself—that Earth is due to be attacked by invaders out of space. It's preposterous, Whiting. Why would the invaders wait fifteen thousand years to attack?"

Whiting shrugged.

"I don't know their reason. But I know this—to cross the void of space between Earth and even the nearest star is no little task. You don't build ships overnight to make that crossing. It would take much time to build the ships, much more time to make the crossing. The thing that surprises me is not that they waited fifteen thousand years to attack again, but that they ever came. One such effort would exhaust a race."

"I think it's a hoax," said the general. "A publicity stunt."

Mark Whiting started to speak, and abruptly changed his mind. His face was hard with the lines of anger, hard because he knew the anger was helpless. In time, months, he could convince this smug general, but he doubted there was that much time to be wasted, that there was any time to be wasted.

Before he could frame a careful answer, before he could offer to show the general the instruments in the capsule, an orderly came running from the portable radio station the national guard unit had set up on the field, and which was in operation, now that the powerful impulses from the capsule were off the ether. The orderly shoved a square of paper at the general.

The aides shifted nearer as Warsin read the wire. They watched his face. He didn't say anything. He looked up. He finished reading the message, and looked up.

Overhead were the bright blue skies of May. Fleecy little clouds were floating along. The air was warm with the promise of spring.

Warsin jerked his eyes down.

"Whiting, the observatory at Rome just reported having detected a disturbance on the moon. It's night in Europe. Their telescope is not powerful enough to make definite identification, but they think they have seen a fleet of space ships—landing on the moon."

CHAPTER III

Catastrophe

SIDNEY DINGLE listened. He got up and paced the floor. He sat down again. He bit savagely at the butt of a long-dead cigar. He listened.

"Twenty-five days have passed since the Sirians landed on the moon, twenty-five days of feverish activity here on Earth as scientists, working in full collaboration with Army, Navy, and

industrial experts all over the world, have attempted to fabricate the weapons used by the old civilization to destroy the invaders. The old scientists unquestionably had c r u d e atomic power. They had a heat ray that would melt steel at the distance of several miles, a beam carrying radio frequency energy that turned into heat energy when it struck. They had flying torpedos powered by rocket drive and carrying atomic explosives. And they needed all their armament to conquer the invaders when they struck at Earth thousands of years ago."

The announcer was getting hoarse. The words were running over each other. He had more to say than he had time to say it.

"The Time Capsules revealed construction plans for the weapons of the old civilization. And what a debt of gratitude we owe that race who, perishing, did everything they could to make the future safe! Construction of these weapons has been rushed all over the earth. Every large city has at least one heat beam and many of the flying torpedos.

"For the first time in all history there is complete cooperation among all the nations of the Earth. . . .

"As you know from previous broadcasts, the Sirians established a base on the moon. They sent out a speedy scout ship to reconnoiter Earth. It circled the planet in less than a day, returned to the moon. The main attack is expected at any time.

"Every effort was made to contact the scout ship. Balloons were sent up, carrying white flags. Bombing planes went to their ceiling. Earth wants peace, will make almost any sacrifice to get peace. The Sirian scouting ship rayed the bombers out of existence, smashed the balloons. The actions of the scouting ship show there is little hope. Their first expedition was destroyed here on Earth centuries ago, and now they have come for vengeance. Lord knows what they came here for the first time. Conquest?

"They want war. And they're going to get it. The stratosphere bombers, the flying fortresses, every squadron of flying planes that Earth owns, is ready to take to the air, their pilots waiting, their guns mounted. The surface fleets of all nations are drawn up as near as possible to the principal cities, their fourteen- and sixteen-inch guns raised to highest elevation.

"But more powerful than the air and sea fleets will be the torpedos and the heat beams of the old civilization. The invaders are due for a surprise. They are moving in to attack what they think is a defenseless world. But wait until they meet those beams and those torpedos. What a surprise they will be!"

In a Chicago suburb Sidney Dingle listened. In another suburb Marcia Whiting listened. She had not seen her husband since he had dashed from the house that fateful night. Telephone calls, wires, didn't mean much. She wanted to see him, be with him, as they had been in the old days before money had come.

In central Illinois Seth Johnson listened. Over the middle west, ten million Seth Johnsons listened.

Factory hand, dishwasher, gambler —merchant, garageman, office boy— New York, Chicago, San Francisco. They listened. Already the evacuation of the cities had begun. But the first wild panic was over. The evacuation was orderly.

Overhead, in serene skies, the June sun shone. Millions looked at the skies, hundreds of millions. Arab and Turk, Chinese mandarin and coolie, Italian peasant, French shop-keeper, Canadian farmer, and Mexican peon. They watched the daytime and the night-time sky. Where there were radios, they l i s t e n e d while they watched.

DINGLE listened, odd lights coming and going in his eyes.

There was a new announcer. The voice of the first one had failed. And the second was becoming inarticulate.

"We are assembling bulletins and putting them on the air as fast as we can. We will keep you informed as long as this station stays in operation. . . .

"Flash—A Sirian ship over Europe.

It was spotted by a vague glowing surrounding the ship like a shell. The ship is high, many miles in the air, and is moving slowly across Europe. Radio messages are being hurled at it, but they go unanswered. Every city in Europe is blacked out. The attack is expected at any moment. . . . One ship against the armed might of Europe. The whereabouts of the other three ships is unknown. . . ."

Sidney Dingle listened, and as the words poured from the radio, he started nodding his head, smiling a blotched smile.

"What a good program this is! Lots of good programs I've put on the air, but this is the best of all. It's got everything. I'm glad I sponsored it. All over the world people are hearing about Inkie-Pinkie Candy Bars. . . ."

"Paris in flames. The Sirian ship moved down to the attack. At first it was beyond the range of the heat beams, and the torpedos were loosed. Many missed, but several of them made direct hits. Only the hits didn't affect the ship. The Sirian ships have something they didn't have when they attacked thousands of years ago. That vague glowing nimbus surrounding the ship is a defense screen of some kind, that either explodes or destroys the shells that strike it.

"The ship came lower. The heat beams touched it, flared with the light of a small sun. But the ship was unharmed, and the heat beams lost their energy on the screen. It started dropping thermite bombs, working its own heat beams through its screen. Fires immediately started. Then explosive bombs. Tremendous things — the sound of the explosions was heard in London. . . . Paris in flames. . . . No further reports from Paris. . . . The three other ships unreported. . . ."

Sidney Dingle nodded. The blotched smile made his face a hideous thing.

"What a program! A million dollars it's costing me, but it's worth it!" He frowned, his heavy face breaking into oily wrinkles. "Or it would be, if he would only mention Inkie-Pinkie Candy Bars. Here I pay a million dollars for this program, and he won't even mention my product."

With a gulp and a sigh the radio went off. Dingle stared at it, frowning fretfully.

"Now they won't even let me listen to my own program."

He got up. There was a whistle outside, a whistle that started shrill and ended up hoarse. A heavy, sinking plop. The house shook. He had time to look out the window. There was light outside, a sudden, pushing flare of light. He saw it. Then it pushed him.

Like a gigantic hand, the light and the force riding the light pushed him, and his house with him.

It didn't matter. In five seconds he was dead.

One of those unreported ships was over America, over Chicago.

Another was over Asia. The fourth was beyond the atmosphere, a reserve force, waiting.

CHAPTER IV

Death

SETH JOHNSON swung a sack of provisions over his shoulder. His wife had an armful of pots and pans. He glanced at her. Her face was pale. She looked sick.

He loosed one hand from the sack, tried to pat her shoulder.

"We'll do the best we can, Maw, but now we gotta hurry up and hide. And Maw—I'm sorry I pestered you by drinking now and then."

Her voice was toneless.

"It's all right, Seth. We'll hide out in the cabin in the woodlot." They had listened to the radio, until the station went off the air.

They went out of the house. Seth looked at the sky, where only recently something had passed, something that split the air with the sound of rolling thunder. But now the sky was clear.

He looked at his cornfield, at those scared youngsters still trying to maintain guard positions around that mound of earth. If he had only known

that capsule was there—then men like that Mark Whiting might have been able to figure something out, to build guns that would smash those ships.

But he hadn't known. Nobody had known. And now it was too late.

Night came on. Night found them in the cabin.

DAWN came up out of the lake. Two hundred years before, the dawn had not found the lusty, bawling city of Chicago on the lake. And this dawn did not find much of it left. The fires were still burning. The pall of smoke was heavy against the sky as Mark Whiting entered the suburb that had been his home.

He walked. For miles now, he had walked. On a highway jammed with mad traffic, his car had been forced into a ditch. Nobody was going toward Chicago. Those who had survived were fleeing, now that Earth's defenses had crumbled like so many lead soldiers guarding a sand fort.

He tried not to think about those people, he tried not to remember the way they had looked in their mad flight. It was not hard not to remember. There were too many things on his mind. Marcia, here in this suburb. He kept thinking of her, and swallowing the lump in his throat.

He did not know that his bearded face was blotched with dirt, did not care. He did not know that he stumbled as he walked. Now and again he noticed the bodies over which he stumbled, but he tried not to notice them. They were too frequent.

He saw the holes in the ground, the charred lumps of burned buildings. The air was heavy with smoke and he coughed as he walked.

If only there had been time! What a world of information there had been in the capsule. The old civilization had known much. They had been close to the secrets of matter itself. Molecules, atoms, electrons, protons, positrons.

Even with the help of the best language experts in the country, it had been hard to follow the exact shades of the meaning of the words, but he had gleaned enough to know that the new knowledge added to the old would have helped—if there had been time.

And if the invaders had not improved their ships. That defense screen. The old civilization had not faced that. The old scientists had not been able to foresee it. He wondered what it was. Not too hard to guess. An electron barrier, perhaps, a fabric of woven strains, a force field.

This was his house. It looked as if a playful giant had pushed it backward. Oddly the bricks above the door had not crumbled, and the door was open.

They had been playing bridge in this room when last he saw it. Now the walls had crumbled inward, the furniture was crushed, the ceiling gaping open.

There she waited for him.

He pulled away the bricks. He held her in his arms. For minutes—or was it hours—he held her in his arms, rocking back and forth on his heels. For in his way, Mark Whiting had loved his wife, had loved her fragile whiteness, her quiet beauty.

Now she was quiet forever.

OVER the earth there were many others who were quiet forever, many others.

He carried her to the back yard, where there had been a rose garden. He dug. There was no headstone, there could never be a headstone. For a long time he knelt there, and when he arose, his eyes were strange and his mouth was strange. He looked at the sky.

In the sky were clouds of smoke, billowing evidence of the destruction wrought by the invaders who were now dropping their bombs, training their beams, on some other city.

He was leaving this place, forever, and he knew it. He looked at the house. There was one thing he wanted to see before he left.

He forced his way up the stairs. The roof was gone, and so were the walls of the third floor.

The receivers were shambles where bricks had fallen.

The other thing he loved was de-

stroyed, never more to be replaced.

His eyes went over what remained of the room, went to the table where the radio set built by a kid rested. It had escaped destruction. A part of a rafter lay across the tuning coil, flattening it. The transmitter was intact.

He looked at that crude assembly of battered instruments, and some of the knowledge he had gained from the time capsule came unbidden to his mind. For the first time he knew consciously what he had only sensed before—the hidden potentialities of a set built by a kid.

He didn't move. His gaze was fixed. Then he moved quickly. From the 40-meter transmitter he jerked coils, from the almost-no-meter transmitter he jerked other coils. He dismantled the set he had built as a kid, taking parts from it and adding other parts. He worked feverishly. Again and again his eyes went to the sky. There was only smoke overhead.

THE guard took him into Headquarters. General Warsin jumped out of his chair at the sight of the figure who walked in. In spite of the dirty beard, torn clothes, shambling gait, Warsin recognized this civilian.

"Whiting! My God, man! Where have you been? Three days we've been looking for you."

Mark Whiting gulped.

"I went—after my wife. I got there, too late."

Warsin's face was already haggard. That came of sending men to die. He swallowed before he spoke.

"I'm sorry . . ." He looked away.

Then his voice was harsh again.

"But three days, man. We've needed you as we never needed any man before."

Whiting nodded his head westward.

"They thought I was crazy at first, because I carried this." This time the head nod went down toward that crude assembly of instruments. "Then I convinced them that even if I was crazy, I had to get to Headquarters. Well, transportation is disorganized. I had to wait for a plane." He didn't say anything more. He didn't need to. All transportation was chaotic.

Warsin knew more about that disorganization than Whiting did. Panic, after the first raid. Highways disrupted, railroads blocked. Even the army had been panicked. But they had reorganized. They wouldn't panic twice. They might die this time, but there would be no panic.

Warsin glanced at the crude assembly of instruments. His voice was still harsh.

"Do you know what's happened?"

Whiting shook his head. "No news. But I haven't seen an enemy ship since the first raid."

"After Paris was destroyed, Europe surrendered, unconditionally. The invading ship landed, collapsed its defense screens. Instantly it was blown off the map with a barrage of torpedos, the ship turned to molten metal with heat beams. It was rank treachery, and Europe paid a heavy price for it, all the price there is to pay, in fact. Within hours, the three other ships were over Europe. They began a systematic beaming and bombing of every city on the continent. Europe fought back, of course, but they couldn't get a shell through those defense screens. We're probably next on the list, and only a miracle can save us. Whiting, is there anything that can be done about that screen?"

Mark Whiting did not answer. He eased the bulky apparatus to the desk of the general. He collapsed into a chair. "Yes—if their screen is an electronic barrier—there is a miracle, a scientific miracle . . ."

He slid down into the chair, his head drooping downward.

CHAPTER V

Victory

MARK WHITING opened his eyes. He tried to sit up. He saw the room was filled with men in uniform, sensed a tenseness in their bearing. He gulped gratefully at the bottle offered him. It burned like

fire, but it gave him strength.

"What is it, Whiting?" General Warsin insisted. "Minutes count now. The three vessels of the invaders are approaching this country. They've finished with Europe."

"There." He pointed at that crude assembly of instruments, at the radio set that a kid had built, that a man had rebuilt.

Warsin saw the crudity of the work, saw, also, that it was something a man could carry. If it had weighed forty tons, perhaps it would have impressed him. But this — this . . . Something went out of his face. He aged years in those few seconds. His eyes went over those coils, the twisted, clumsy wiring, the spindly, fragile web of copper ribbon building up into a cone.

"Crazy," an aide whispered. "He's crazy as a loon."

"I'm not crazy," Whiting blazed, coming to his feet. "I built part of that outfit when I was a kid, built it as a radio transmitter. That's what it is—or was. With what I learned from the records of the Time Capsule, I saw it could be changed into a positron generator, the flow of positrons directed in any desired direction by this coil of ribbon wound in the form of a cone. Do you know anything about positrons?

"No, you don't know. But you know enough to call me crazy. Positrons combine with electrons in a complete annihilation, with the release of gamma rays. If that screen is an electron barrier. . . ."

How many cranks had Warsin seen in those last three days, crazy men who knew how to save the world? For a civilian, Whiting had been brilliant, but he had cracked, just like too many others. Warsin looked at him, saw the wild light in his eyes.

"He's crazy," said Warsin. "Get him out of here. Yes, let him take his junk with him. Order all defense squadrons into action. Throw a barrage of torpedos against the ships as they approach. Train the heat beams. We don't have a chance, but we can at least die fighting."

Mark Whiting screamed, once. He grabbed the board to which the junk was screwed. He didn't try to say anything. But as rough hands shoved him from the room, he was crying.

OUTSIDE Headquarters, the guards were looking up. Anti-aircraft batteries were swinging around, the gaunt muzzles of the guns reaching toward the sky. There was a continuous heavy roar as squadrons of flying fortresses took off from a nearby field.

Headquarters was near the beach, on the Jersey shore. Out there in the channel, warships were swinging around, and long snouts were climbing toward peak elevation. From the runways of the airplane carriers wasp after wasp was taking off, wasps with futile stings.

Somewhere a bugle was screaming.

Along the shoreline, the gun crews trained to handle the flying torpedos were swinging their launching tubes around. Other gun crews were training the high frequency beams that would turn to searing heat on contact. The generators for the heat beams were roaring. All the weapons of the old civilization, all the weapons revealed by the Time Capsule, all the armament invented by the savage warrior races were being brought into play.

Mark Whiting looked up. Three gleaming shapes were coming through the sky. Low, not over a mile in the air. Coming slowly, surely, with thin hazes momentarily stabbing down from them. From openings in their heavy bottoms dark objects were plunging, and where those objects struck, there was catastrophe. Around the ships their defense screens twinkled.

Already torpedos were striking the screens, were flaring into light as they exploded. Beams were pouring into them, to burst in glittering floods of intense brilliance. A few of the bombers were already above them, and bombs were coming down, futilely. Black shapes darted at the gleaming ships, wasps stinging at them. Now and again a wasp would dive full tilt at them, to flare against

the defense screen.

The screen that the old civilization had not foreseen.

There was a roar that shook heaven and earth as the batteries of heavy guns on the warships let go, sent their tons of hurtling steel screaming through the sky. Broadsides that would smash another warship into a hulk flared as they struck the defense screens.

But the ships came on. Untouched, unharmed, protected.

Mark Whiting was crying. He ran down toward the sea, he studied the course of the incoming ships. He ran along the shoreline. He ran in the same direction as the incoming vessels, ran like a crazy man, and he cried as he ran.

They were coming directly toward him, coming slowly, with the certainty of doom.

Behind him, on the beach, a heat beam lashed into the sky, its generators roaring. He ran toward it. There were two gunners. They struck at him. He snatched a pistol from one of them. He shot twice. The sound of the pistol was unheard in the gathering roar that was shaking heaven and Earth.

Whiting snapped the switches on the generator. He cut the current into that crude assembly of instruments he carried. Swiftly, his flashing fingers made the connections. Power, a source of power. He cut on the generator again. He swung the cone around.

He waited. The ships were almost overhead. The bombs dropping from them were striking out there around the battleships in the channel. There was a shuddering roar as a battleship exploded. There was another shuddering roar. Beams reached down from the ships, and where the beams touched water, the water boiled. They touched the sandy beach, and the sand flared in an explosion.

They were almost over him. He closed the final switch. From the coil wound in the form of a cone an invisible line of radiance fluted outward, became vaguely visible as the positron flow from the cone met free electrons in the air. The stream of radiance touched the foremost ship.

SETH JOHNSON and his wife listened to the radio. The voice of the announcer wavered and faded, the radio sputtered. But it was definitely a human voice, where for four days the radio had been completely silent. Each day Seth had sneaked back to the house and listened, each night.

"We are broadcasting with emergency power, so we can get this news to you as quickly as possible. There is no definite information as to exactly what happened. It is known that Mark Whiting visited Headquarters, which had been set up in New Jersey near New York, immediately before the attack began, but inasmuch as General Warsin and his entire staff were killed, the weapon that Mark Whiting gave them will probably never be definitely known. The three ships of the Sirians were moving in, dropping bombs as they came. All the weapons that lined the shore, all the weapons designed to protect New York from that direction — or what was left of New York after the first raid—were firing at them, uselessly. No shell, torpedo, or beam ever got past the defense screen.

"But, suddenly, as the ships moved to the shoreline, the defense screens started flaring. Observers are unable to account for this sudden flare of light. It wasn't exactly light. It was a quick puffing of an invisible radiation. Men on the ground felt a quick burst of warm rays striking them. Then the screens were gone.

"Instantly, the heat beams began to tear at the ships, the torpedos began to take effect. Apparently a complete salvo from the main battery of one of the warships struck the leading Sirian ship. The explosion of that invading vessel destroyed all life under it over an area perhaps a mile in diameter, but the same explosion also smashed the other two ships to the ground. The bombing planes coming to the scene made a shambles of the wreckage. . . .

"How Mark Whiting collapsed the

defense screens will probably never be known. Probably he used some weapon found in the Time Capsule. One thing is certain. The world owes a debt of gratitude not only to the race that left the Time Capsules as a warning to us, but also to Mark Whiting, who, with thousands of other gallant defenders of this country, died in that battle on the Jersey shore, died even in the moment of victory. . . ."

The radio died in a broken sputter. For a long time Seth and his wife said nothing.

Then she spoke.

"What did Mark Whiting look like, Seth? You saw him."

"He didn't look like much of anything, Maw. A little guy. You'd never be able to pick him out in a crowd. But he had something. I don't know what it was, but you ought to have seen the way he made those generals step around. He had an eye on him. . . . I kind of liked the spunky little devil. He didn't ask 'what for' or 'how much.' He said 'do this' and 'do that,' and by golly, he got things done. . . ."

He sighed.

"It ain't right for him to have got killed like that. He was worth a million of me, but I'm left and he's gone. . . ."

Seth Johnson didn't know that it is the Seth Johnsons who survive, while the Mark Whitings die. But, on the other hand, few of the Seth Johnsons ever get statues erected to their memory. . . .

Seth looked at the radio. He looked at his wife. She was crying.

In his little way, he could be heroic too. He patted her on the shoulder.

"Now, now, Maw; quit blubbering."

And when she didn't stop, he was driven to extreme measures.

"Maw, if you'll only stop blubbering, I'll promise you I'll never drink another drop of applejack as long as I live. . . ."

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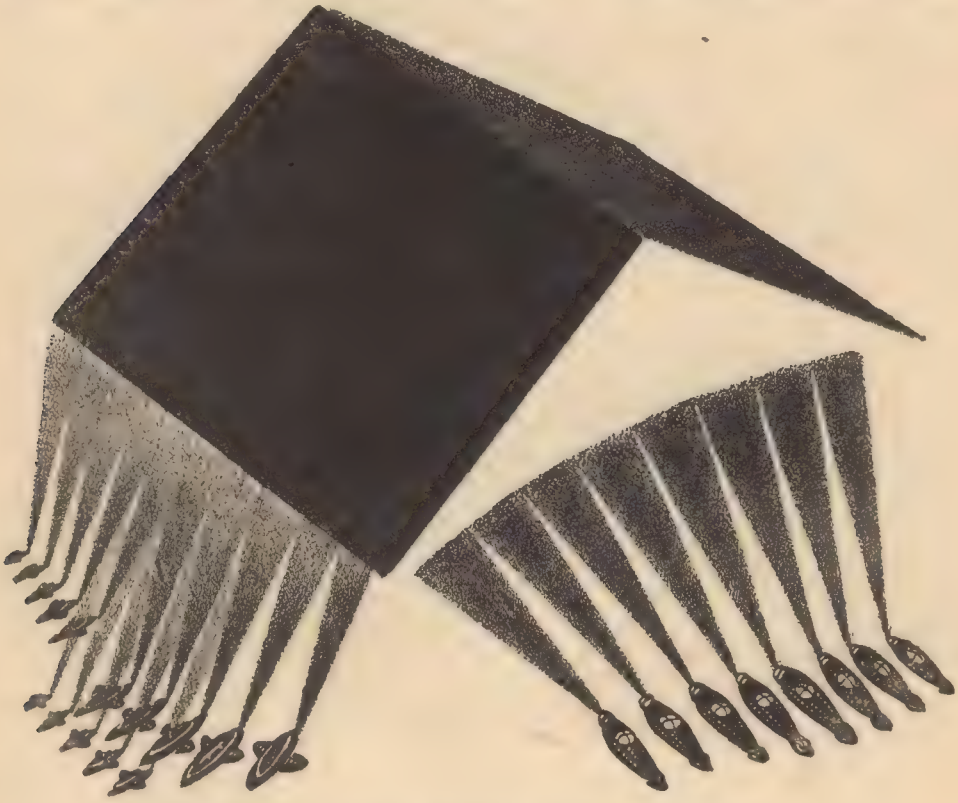


Brilliant white flashes appeared against the green surface of the cube

The Mighty Missile Was Headed for Collision with the Earth—but Science Planned a Detour!

By GRAPH WALDEYER

"ONE thing more, Mr. Secretary!"

The tall, distinguished-looking Secretary of War paused with his hand on the doorknob, raised inquiring eyes at the two men seated at the desk.

Both men were young. Herbert Monroe, the man who had spoken, was tall and lithe, gave an impression of suppressed energy that seemed to find release in flashes of light from steely gray eyes. His companion, Rob Gilton, was shorter, compactly built and substantial-looking; the "dependable" type. Both men were known to the scientific world.

"I must be in absolute command of the fleet of space ships that is to blast the—the object out of its position in

the Earth's orbit," Monroe said firmly. "I must have that assurance from the President of World States before proceeding."

The War Secretary drew himself up with dignity. "The Department of Planetary Defense is quite capable of directing the maneuvers of its own fleet of space ships," he said icily.

MONROE'S gray eyes glinted, but he spoke patiently.

"I don't deny that. It was amply proved last year when the fleet put the Venusians to rout. But this matter requires scientific, not military strategy. All the neutron bombs in your armories will never budge the object from its position within Earth's orbit unless we apply a special technique." Monroe rose from his chair, as he went on: "That is why the Government of World States has solicited my assistance. It believes I have solved the mystery of the object's presence, know how to dispose of it before the Earth reaches its orbit three days hence!"

"But placing a civilian in charge—"

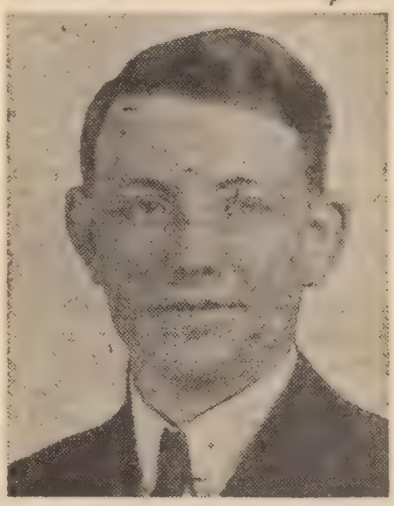
"Mr. Secretary" — Monroe's voice had an edge to it—"there is little time left to argue formalities. Kindly place my request before the President without delay!"

There was a short silence while the angry steps of the War Secretary echoed down the corridor. Then Monroe chuckled.

"There goes the military mind," he said to Rob Gilton. "Just can't comprehend anything of an unorthodox nature. Full of a thousand years of military tradition, rugged common sense —and ossification! If I had told Mr. Secretary what I believe the Cosmic Die really is he would have me slapped in a madhouse!"

It was an old story to Rob Gilton, these disputes between authority and his brilliant friend, Monroe. Yet he knew that had Monroe not been so free of preconceived ideas, so ready to follow wherever his brilliant deductions led, he could never have perceived the incredible truth about that huge cubic visitant from space.

Meet Mr Waldeyer



Graph Waldeyer

Graph Waldeyer is thirty-five years old, single, and a resident of San Francisco, although born in Maui, Hawaii. Ten years ago he put in a six-months' stretch as a cub reporter for the San Francisco *Call-Bulletin.* At various times he tried his hand at fiction writing, but COSMIC CUBE is his first successful attempt.

Mr. Waldeyer has been an amateur astronomer for twenty years, and he owns a four-inch refractor and five-inch reflector. Last year he took the refractor downtown at night and made a sign saying, "See the Moon—10c." He didn't do so bad, he reports.

For Monroe was a scientific detective. Except that his field was the cosmic scene, rather than mundane crime, he startlingly resembled an old-time fictional character, Sherlock Holmes. Like that personality, he possessed an uncanny ability to reason from effects back to causes. In Monroe's hands, seemingly unrelated facts of the Universe had frequently been welded into a whole that startled the scientific world. Hence, when the menace of the Cosmic Die suddenly confronted the world, its Government turned to Monroe.

The mystery of the Cosmic Die tested Monroe's analytical and reasoning powers to the utmost. It had been detected during routine sky-sweeping by the five-hundred-inch telescope at the Mt. Palomar Observatory. Seem-

ingly at rest in the vast trans-Plutonian spaces, the object was accurately cubical in shape, shone palely by reflected sunlight. On one of the surfaces turned Earthward were two rather well defined darker discolorations which made it resemble the "deuce" surface of ordinary dice.

A reporter, seeing these dots through an observatory telescope, had written sensationally of it, termed it the "Cosmic Die." The populace referred to it inaccurately by the plural, or "dice." Astronomers merely called it the "cosmic cube."

Parallax measurements showed the object to be about five billion miles outside the orbit of Pluto, a few degrees north of the plane of the ecliptic. It had the tremendous diameter of 300,000,000 miles from surface to opposite surface, nearly as large as the giant star Antares. Its density, as calculated from size and gravitational perturbations on the outer planets, was about that of earth's atmosphere ten miles above sea level.

Monroe and Gilton studied the object nightly in the young scientist's well equipped private observatory, housing a fifty-inch reflecting telescope.

"Any solutions yet, Herb?" Gilton asked his friend a few nights after its discovery.

Monroe placed the tips of his slender, strong fingers together and pursed his lips.

"The world's scientists," he decided, "are way off the track, because they are attempting to explain the object along the lines of accepted cosmology. This is, however, probably the first time since the Universe began that this particular class of phenomena has occurred. You know the characteristics of the Cosmic Die as well as I do. However, it may get it clearer in our minds to restate them briefly. First, a non-solid object in free space should, according to physical law, assume a spherical form. Yet the Die retains a cubical form. There is only one possible deduction from that—the object must be classed as a solid! It is in the grip of the same forces of cohesion that hold to a given form the solids we are familiar with. Its electrons are simply more widely spaced in their orbits. Indeed, all matter, solid or non-solid, consists largely of empty space. The essential difference is not in the separation of the component particles, but in their equilibrium.

"Even more extraordinary, is its apparent lack of any motion through space. Its *apparent* motions are explainable by the motions of the Earth, Solar System and general star drifts. From a point of absolute reference into space, the object is utterly stationary! Yet, it must have moved into that position to begin with. Or could it have—"

Monroe stopped suddenly and his eyes bored into a spot on the observatory wall.

"And some influence stopped its motion?" prompted Gilton after a pause.

"Eh, what?" Monroe roused from his abstraction. "Perhaps it did. I don't know. But if it would move now, some peculiarity of its motion might supply just the clue I need to supplement my theory, enable me to fully understand it."

HE did not have long to wait. A few days later he was engrossed in studying some photographs of the object, and Gilton was peering at it through the fifty-inch reflector.

"Herb!" he called out suddenly. "It's turning over!"

Monroe sprang to the eyepiece and looked.

"So it is." Quickly he attached the visual spectroscope, studied the lines for a moment. When he looked up there was fierce excitement in his voice. "It's rushing toward Earth with half the speed of light!"

"Great planetoids! Will it strike?"

"Too soon to tell." Monroe figured hastily on a pad. "At that rate we still have about twenty-four hours of grace. By this time tomorrow night it will be in the vicinity of Earth—if, indeed, it does not strike Earth squarely."

All that night Gilton and Monroe took turns at the telescope, checking, calculating, as the cube rushed toward Earth. Its motion was peculiar indeed. As it crashed through the orbits of Pluto, Neptune and Uranus, the two observers found an amazing coincidence

in its movements. Each time a new surface rotated into view, it was found to have approached Earth by exactly its own diameter—300,000,000 miles!

And as surface followed surface the cube continued its rush earthward at half the speed of light. It seemed as if the observers were witnessing a film in slow motion of a huge ivory cube—a die, rolling toward them end over end.

Later astronomers were to find it had dragged Pluto inside the orbit of Neptune, given Jupiter a new orbit, with the closest point only 150,000,000 miles from that of Earth! The other major planets, being on the opposite of the Sun, escaped with minor perturbations.

That night all the observatories of Earth watched the approach of the huge cubical mass. By midnight the next night it had made six complete revolutions, traveled 7,000,000,000 miles sunward. Then, as one corner of the monstrous bulk was encroaching on Earth's orbit it seemed to hesitate, stopped, moved backward about half its diameter, then came to complete, utter rest!

Again, from a point of absolute reference in space, it was stationary. And with a corner about 50,000 miles in diameter bisecting Earth's orbit where Earth would pass in a week!

Now it filled the night sky with its dimensions, a huge palely glowing cube in space, seemingly about to crash down upon Earth like a cosmic block of granite. All the states of the world declared martial law to control the frenzied populace. And inevitably the planet of men rushed onward toward the cubic doom that had apparently come out of mysterious deeps of space to disrupt a Solar System.

It seemed that on all Earth only one man had a plan. While scientists and statesmen were in a maelstrom of uncertainty Herbert Monroe mapped out a campaign of attack on the Cosmic Die.

"I THINK I know the secret of the cube, and what must be done about it," he told Gilton. "Even so, it is only an extraordinary accident, a purely chance circumstance attending the cube's motion that may make it possible to save Earth. Did you get the significance of that last erratic motion before it came to rest—that final teetering and retracing? It points the way to a possible reprieve for Earth!"

Following the rather unsatisfactory visit of the War Secretary came Presidential permission, accompanied by an urgent personal note from His Excellency for Monroe to assume complete charge of any operations required to rid the Solar System of the cubical doom.

Monroe's plan was to blast it from its position in Earth's orbit. The bombs to be used were of the dense material that had been excavated from the Companion of Sirius by the Fourth Stellar Expedition several years before. These bombs were powerful enough to blast a planet from its orbit—or blow it up.

"Even so," said Monroe to Gilton, "but for that peculiar circumstance revealed by the last motion of the cube, no amount of blasting power could budge such a tremendous mass!"

It was already arranged that Gilton was to accompany Monroe on the flagship of the space fleet.

"In spite of having *carte blanche* from the President," explained Monroe, "I may need your moral assistance when the commander of the fleet learns my plan of action!"

Finally, with Earth only six short hours away from cataclysm, the hundred space ships were ready. Affixed to each by a tractor beam was a huge space barge loaded with the tremendously potent bombs of dense matter. Gravity nullifiers, over which the matter was perpetually stored, were in place.

Row by row, shimmering in the glow of the cosmic cube, the long silver space ships rose toward the star-studded sky, towing their formidable cargo. When they were free of the atmosphere they accelerated to full speed and dashed toward the cube. With them went the hopes of Earth.

Back on that planet fanatics and mystics helped keep the populace in a frenzy of fear. The Cosmic Die, they warned, was a symbolic and befitting punishment of humanity for its sins. All asked: "Will another Earthly day dawn?" And all knew the answer depended upon one man up there in the flagship of the space fleet.

As the ships approached the cube they seemed to be heading into a solid white wall that extended to infinite distances in every direction, seeming to portion space into two sections. Within a few thousand miles of the surface they came suddenly upon a fleet of the queer triangular Venusian space craft, darting about like bees. The Venusians, upon sighting the Earth fleet, turned tail and fled to a safe distance. Queer radio signals came from them.

Monroe listened, smiled grimly.

"That," he said, "is the Venusian equivalent of what, several hundred years ago, was known as the 'Bronx cheer.' They're here to enjoy the spectacle of Earth's destruction."

He turned to Commander Judson, a straight stiff man with exaggerated military bearing and tight lips. An efficient man in battle, he had been in command when the Venusians were decisively whipped by Earth's fleet.

"NOW, Commander," ordered Monroe, "bring up the fleet to a position at the outer side of the cube, the side facing away from Earth."

"But surely, Mr. Monroe, you are going to blast at the *inside*, so as to shove the cube out into space again?"

"No. We will blast at the *outer* surface."

"But good God, man, that will simply push the thing into the Sun!"

Monroe gave Rob Gilton a significant look, as if to say, "What did I tell you!" To the commander he said:

"You have my assurance it will not."

"What will prevent it?"

"Gravity," clipped Monroe.

The commander bristled. "This is hardly time for horse play, Mr. Monroe," he rasped. "I have an elementary education. I know that gravity attracts two bodies. Yet you tell me that the Sun's gravity will repulse rather than attract the cube!"

"I am not speaking of the Sun's gravity," said Monroe enigmatically.

"You're not speaking . . . Captain Blake! Place these two men under arrest. The President has been duped. I will not have Earth's fate rest on the whim of a madman!"

"No you don't, Commander!" Monroe's incisive voice was backed up by a short, ugly skiz-gun, which had appeared in his hand. It pointed unwaveringly at Commander Judson. Rob Gilton, previously instructed, covered the other officers and men.

"Men," began Monroe, "you all know that I have been placed in charge of this expedition by the President. Since the fate of Earth is at stake I intend to shoot if necessary to enforce my orders." He turned to the commander. "Will I have to place you under restraint, Commander, or do I have your word as an officer and gentleman—"

"Look!" shouted one of the men, and simultaneously through the portholes of the ship came a weird green glow.

Dashing to the portholes the occupants saw that the cube now glowed with a brilliant green luminescence, which shot out into space, splashing the now close Earth and its satellite with green drapery. So awesome was the spectacle that even Monroe relaxed his vigilance for a moment. In fact, he was attempting to find the place of this new phenomenon in the solution he had already reasoned out. Slowly an expression of comprehension dawned in his eyes.

"Yes," he muttered, "that must be it."

He was shocked back to attention when he was grasped from behind by two pairs of strong arms.

"Tie him up!" barked the commander. "And hurry! We have less than an hour to blast. Why, where's the other one?"

Gilton was over by the radio apparatus, pulling at some wires. Just as three men reached him he tore them loose.

"You blithering idiot," yelled Commander Judson, "that's the radio! Now we can't contact the fleet!"

Seething, he turned back to Monroe who, trussed up in a corner, had his head inclined at a curious angle and seemed to be muttering to himself.

"A VEST radio!" rasped the commander. "He's giving orders to the fleet! Search him, men—bring it here."

A moment later, using the tiny radio set Monroe had concealed on his chest, the commander negated the order, in-

structed the fleet to stand by.

"Now Mr. Monroe," he said, "I am a fair man—fair enough to bargain with an obvious maniac. If you will explain fully your theory about the Cosmic Die, including why you insist on blasting at the wrong surface, then—assuming I find it tenable—I will give the order to blast at the outer surface. If you refuse I shall give immediate orders to blast at the inner surface. We haven't much time. Earth will strike the cube within half an hour. You have two minutes to answer."

Monroe leveled a probing glance at the commander.

"Very well," he said, finally. "I have no choice. Telling you the truth will probably seal the fate of Earth, but it is doomed in any event, so I may as well spill it."

And so, while Earth with its cities and millions of scurrying people rushed closer to destruction, Monroe unfolded his theory about the cosmic cube—a theory postulating an astounding and incredible state of existence, at which the intelligence of the listeners reeled.

Monroe's deductions as he revealed them to the officers and men of the flagship, were correct in all fundamentals. In the meantime, even while he was talking, in that other state of existence that Monroe postulated but could never enter, things were happening — astounding things! In the strange world of the Grinians of which none aboard that space ship knew. . . .

WAR BUKKA ushered his friend, Gat Asig, into the laboratory. Neither uttered vocal sound. But by the play of expression on their appendage-studded countenances — tiny muscular jerks, ripplings of the exterior covering, vari-colored flushes—they conveyed the most subtle nuances of thought and emotion.

"The experiment," War Bukka was "saying," with a comic drooping of facial nodules, "has gone haywire. As you know, I was trying to transmute the metal tunkium into blasgot. I left the Gena-ray on all Hypnos-period. When I returned I found the block of tunkium had been condensed—shrunk, instead of transmuted. It is reduced in size millions of time, and correspondingly denser! It is now inconceivably dense, and so small the super-microscope will just barely show it. Here, see for yourself!"

Gat placed his fifth, or short-focus eye to the microscope aperture. In the field, magnified millions of times, he saw a tiny cube of whitish metal. He looked up from the microscope, nodules circling in amazement.

"Is that the large block of tunkium you had on the tray yesterday?"

"It is the same," replied Bukka. "But try to move it. You'll see how heavy it has become."

Gat bent over the microscope again, turned the screws that operated the infinitely thin but strong pincers used for picking up minute objects under the microscope lens. He clasped the pincers on the tiny cube. It did not budge. He clasped harder, and suddenly the tiny cube escaped from the cruel tension of the pincers and shot across the tray and out of the field of vision.

"Great Zigger!" Gat ejaculated. "I've lost it, War!"

Gat's consternation was nothing, however, compared to the frenzied fear that seized millions in a tinier universe as the cube, apparently resting in the empty trans-Plutonian spaces, suddenly bounded off toward Earth with half the speed of light!

For the extraordinary thing, by terrestrial standards, about Gat and War was that they were of cosmic size. The electrons and molecules making up their material substance were infinitely more widely separated than the particles making up the denser and more solid matter of the Universe as it had hitherto been known. By any human evaluation Gat and War and the world on which they lived was little more than a high grade vacuum.

It was this almost infinite tenuity of the world of Grinians that enabled them to co-exist in the same space with the more densely materialized Universe known to humans. Indeed, had the Solar System passed through the material substance of Gat's little finger — or what corresponded to it — Earth scientists might merely have noted a slightly denser ether drift in that portion of empty space.

The reason Earth astronomers could

see the cube of tunkium was that it had become many millions of times denser than any other object in the Grinian realm. So dense that it partook of the nature of that smaller Universe, reflected the light of the nearby Solar luminary, and was affected by the gravity of its celestial bodies.

AND at this point some being with simultaneous insight in both realms might have had an object lesson in the relativity of size. For while Gat hunted through a super-microscope for the infinitely tiny lost cube, on the planet Earth astronomers at telescopes peered at it from afar. In actual distance, Earth astronomers were closer to the cube than was the eye of Gat!

The trip of the cube across the tray was only a fraction of a second of Gat's time, but it consumed over a day of Earth time. The relationship of time and space in the two realms of existence was weird indeed. It took War Bukka several days of Earthly time to move his tentacle from the work bench to his side. Yet the sweep of his member covered, in those few days, supergalactic distances.

Suddenly War Bukka brought two filaments together with a clap.

"I've got it!" he radiated. "Tunkium becomes fluorescent when exposed to the Zin-ray. I'll simply sweep the tray with the ray, and we'll see."

He swung the ray machine out from the wall and set it over the tray, switched it on. Immediately, at the very edge of the tray, there flashed a brilliant, tiny point of light of a color that to Earthly eyes appeared green.

"There it is!" Gat gave a gesticulated version of a yell. "On the edge of the tray!"

AND this was the luminescence that had distracted Monroe in the space ship and allowed him to be overpowered.

And on Earth those millions awaiting doom voiced a conglomerate wailing. For it seemed that Fate was in an ironical mood, thus to herald the doom of Earth with a blaze of green glory.

When Monroe finished his explanation to the men of the flagship they sat for a moment in stunned silence.

The commander recovered first.

"One question, Monroe," he said huskily. "If the material of this 'surface' on which the cube rests is so tenuous, what holds the cube up? It appears to be resting in emptiness."

"Surface tension holds it up," explained Monroe. "You understand that no two material objects ever actually come in contact in the sense that the atoms and electrons of which they are composed contact each other. It is surface tension, operating at enough different points, that keeps solid bodies from merging into one another. In spite of the tenuity of the hypothetical 'surface,' the cube contacts the surface tension at enough points to hold it up. Even so, I suspect it is just about on the point of size where it might slip through the interstices of this 'surface'!"

"And," asked Captain Blake, the commander's assistant, "you believe the cube is overhanging the edge of this 'surface' and that blasting at the cube's outer surface will nudge it over?"

"Precisely. I came to that conclusion from studying its last motion before it settled back. At that time, and no other, one edge of the cube went below the plane of the 'surface'. It was a simple matter of measurement of photographs to determine this. And if nudged over, it will fall toward the center of gravity —let us call it the Great Planet—of which it is, or was, a part."

"But if this Great Planet attracts the cube, Herb, why doesn't it also attract all the planets and suns of our own Universe?" Gilton asked, perplexed.

"It does attract the bodies of our Universe — just as Earth attracts the electrons of Earthly objects. But Earth's gravity does not therefore wrench these electrons from their orbits! They are in the grip of forces more powerful than Earth's gravity. For, in fact, our Earth is but an atom of a super-world that has been beyond our comprehension. The forces keeping electrons in their orbits are so powerful that even today man has not been able to 'smash the atom' to any practical effect.

"And from the viewpoint of this infinitely larger realm, our Universe is gripped by forces more powerful than

the gravity of the Great Planet. The cosmic cube, being the only object in our Universe at rest with relation to the Great Planet, is the only object susceptible to its gravity!"

Monroe leaped to his feet. "Commander, I have fulfilled my part of the bargain! What is your decision? Earth is very close now!"

The commander arose. "What do you say men? Shall we stake everything on the integrity of Mr. Monroe?"

A thunderous "Yes!" was the reply.

COMMANDER JUDSON barked orders, using Monroe's vest radio. Ten minutes later the flagship and fleet rounded the edge of the cube—and hauled up in amazement. There, arrayed in battle formation, were row upon row of Venusian battlecraft! The men in the flagship were aghast.

"They mean to prevent us from saving Earth!" said the Commander hoarsely. "If Earth is destroyed there will be no Earth fleet to retaliate. That's why they dare oppose us with their entire battle fleet!"

"And Earth's fate is now measured in minutes!" groaned Gilton.

The commander grasped the vest radio.

"We'll try to ram through them, and loose our bombs against the cube," he grated, and placed his lips against the radio to give the order.

"Wait!" barked Monroe. He had been surveying the scene, eyes narrowed in concentration. He faced the astonished crew, eyes reflecting grim humor. "Do nothing! Watch the Venusians!"

"But—but—"

The commander's protest was interrupted by a brilliant series of flashes that seemed to extend across the cube as far as eyes could see, paling its green luminescence by comparison.

"The Venusians are blasting!" shouted Rob Gilton: "But—but why?"

"Don't you see?" Monroe was grinning widely. "They believe they are shoving it further into Earth's orbit, cinching our destruction! Watch the cube!"

Again and again brilliant white flashes appeared against the surface of the green cube as the Venusians released their bombs. Then slowly, ponderously, it began to move, to incline more and more sunward. Suddenly it moved with terrific velocity at right-angles to the direction from which the explosive force had been applied.

"It's working!" yelled Monroe. "The cube has slipped off the 'surface' that held it up, is falling toward the Great Planet—which happens to be in the direction of our celestial North Pole!"

In all the ships of the Earth fleet discipline was overlooked as exultant yells went up hoarsely from thousands of lusty throats. The effect on the Venusians was much different. Their perturbation was evident in the sudden buzzing activity of the fleet—like a disturbed swarm of hornets. Suddenly the entire fleet shot off in the direction of its native planet.

"They failed, are afraid we'll retaliate," was Commander Judson's grim comment. "We'll just leave 'em on the hooks for awhile."

Fifteen minutes later the men in the Earth fleet watched Earth swing in its mighty orbit through the space just evacuated by the cosmic cube.

The Earth fleet hung in space for several hours, until the cube was a good billion miles off, moving with almost the speed of light as it accelerated toward the center of the Grinian planet.

Gat Asig and War Bukka, in their laboratory, were nonplussed, for just as the fluorescence shot out, indicating its position, the cube was nudged over by the Venusian explosive and seemingly disappeared.

But not without visible evidence in the smaller Universe. For a few years later the cube, still rushing off in the direction of the celestial North Pole, removed from the ken of men that age-old signpost and friend of mariners and wanderers everywhere — Polaris, the North Star!

Next Issue: VIA VENUS, the Amazing Chronicle of Venus Expedition No. 1, by GORDON A. GILES

A FASCINATING KNOWLEDGE TEST

DO you know all your elements from Aluminum to Zirconium? Can you calculate how many filterable viruses may occupy a molecule of H_2O? And can you trisect the angle? If you can perform these monumental miracles, then you're a wonder wit and, accordingly, are exempt from this month's SCIENCE QUIZ.

Non-candidates for the Nobel Prize, however, should refer to Page 123 for the correct answers to these quiz-whizzers.

POSITIVE OR NEGATIVE

The following statements are either true or false. Nothing but the truth will bring results. (Par for this course—15 correct.)

1. The total number of meteorites known in the world to date is about 500,000.
2. Boiling food in water is the simplest method of cooking—it is also the most dangerous to human health.
3. Radium is millions of times as active as uranium.
4. The velocity of a star in the line of sight can be determined from the shift in the absorption lines of its spectrum.
5. All parts of the Earth receive an equal amount of cosmic ray radiation.
6. If two identical explosions were heard together they would make a noise twice as loud as one.
7. There are more stars in the Milky Way than there are human beings on Earth.
8. Ordinary oak trees may live as long as fifteen hundred years.
9. According to a theory recently set forth by Prof. Huntsman of the University of Toronto, the death of a fish out of water seems to be due to their violent struggles rather than inability to get oxygen through their gills.
10. Sugar is always sweet.
11. It is now believed that the only molecular difference between chlorophyll and blood is that the center atom of the chlorophyll molecule contains manganese while the center atom of blood contains iron.
12. Fish eating improves our brains.
13. Horses can sleep standing on their legs.
14. Cannibalism would greatly improve human digestion.
15. All of the 92 elements on Earth have likewise been spectroscopically detected in the sun.
16. If two of three quantities of a star are known—apparent brightness, real brightness, distance—the third can be calculated.
17. There is no life in the Dead Sea.
18. The Milky Way is more than five trillion miles long.
19. One of the most widely accepted definitions of intelligence is in terms of ability to learn.
20. The best temperature for mental work has been estimated as from 60° to 65° F.

TAKE A LETTER

Is your I.Q. o.k.? Here are ten incomplete scientific facts that are S.O.S.'ing for the right answers. Three or more suggestions are offered in each case as possible fill-ins for each statement, but only one is correct. Can you pick the winners? Do these P.D.Q. (Par for this group—7 correct.)

1. Our galaxy is thought to be a: (a) globular cluster, (b) spiral nebula, (c) Cepheid Variable, (d) dark nebula.
2. In biochemistry a tagged atom is an atom that: (a) has been made artificially radio-active, (b) can be seen only by the ultra-microscope, (c) contains no gamma particles, (d) causes osmotic pressure.
3. Alabamine and virginium are: (a) vitamins H and I, (b) elements 85 and 87, (c) two newly discovered moons of Jupiter.

4. During sleep, which one of the following does not take place: (a) fall of blood pressure, (b) slowing of respiration, (c) cessation of mental activity, (d) changes in the content of the blood.
5. The gland that is large at human birth and small in adult life is the: (a) pancreas, (b) pituitary, (c) thyroid, (d) thymus.
6. The end product of all known series of radioactive transformations is: (a) alpha particle, (b) beta particle, (c) soil, (d) lead.
7. One of the following is not a star of the first magnitude: (a) Polaris, (b) Rigel, (c) Sirius, (d) Alpha Centauri.
8. The two elements essential for making human bones and teeth are: (a) iron and calcium, (b) calcium and phosphorus, (c) phosphorus and iron, (d) calcium and sulphur.
9. The I-Beam is a: (a) atomic ray, (b) Ion Beam, (c) Gamma Ray neutralizer, (d) structural shape whose cross-section resembles the capital letter I.
10. If the weather report said that it would rain ammonia tomorrow you'd probably be living on: (a) Saturn, (b) Mars, (c) Jupiter, (d) Eros.

PHYSICS MATCH: QUANTITIES vs. UNITS

Can you correctly match the following physical quantities with their practical units? (Example: time—second.) In the parentheses of the right-hand column place the number of the quantity that is associated with the practical unit. (Par: 8.)

Physical Quantity	Physical Unit
(1) capacity	( ) watt
(2) electric energy	( ) volt
(3) electric power	( ) ohm
(4) electromotive force	( ) joule
(5) field intensity	( ) henry
(6) inductance	( ) gauss
(7) intensity of current	( ) foot-pound
(8) quantity of electricity	( ) farad
(9) resistance	( ) coulomb
(10) work	( ) ampere

NUMBER, PLEASE

Join our scientific numbers game. The chances are 10 to 1 you won't get all these 9 parts correct. Merely fill in each blank with the number that will make each statement complete. Remember—there's no score for the wrong number. (Par for this lap—6 correct.)

1. People living in New York partake of the following velocities:
   a.—mile per second, due to the diurnal revolution of the Earth.
   b.—miles per second, due to the annual revolution of the Earth around the sun.
   c.—miles per second, due to the translation of the Solar System toward Vega.
   d.—miles per second, due to the rotation of the galaxy.

2. Neon has the atomic number—. Its nucleus must have—more protons than electrons, and its rings must contain—planetary electrons.

3. If an atom ejects an Alpha Particle, then the residue is an atom of atomic number —less than the original one, and of atomic weight—less than the original.

R-EVOLUTION

The following scrambled words, when revolved in their proper sequence, all pertain to terms used in the science of evolution. How many of them can you identify? (Par for this circuit—7 correct.)

1. teameg; 2. tutman; 3. siamvat; 4. ratphyo; 5. pentoegy; 6. singteec; 7. mesohomocr; 8. patidanoat; 9. rivetmennon; 10. sisterhogone.

WHAT'S YOUR SCIENCE I.Q.?

After you've completed the SCIENCE QUIZ and checked your results with the correct answers, get a slide-rule and calculate your score. Here's how you rate:

49-50—A Mental Giant.
41-48—A Human Encyclopedia.
35-40—B.B. (Bachelor of Bookworms).
30-40—Try Crossword Puzzles.
15-29—Stick to Fiction.
0-28—Absolute Zero.

THE DWELLER IN

By
FRANK
BELKNAP
LONG, JR.

Author of "We, the Invisible," "The Black Vortex," etc.

Miles was impaled

CHAPTER I

The Thing in the Tunnel

WHEN I looked through the stern observation window I could see Miles' tall form looming obscurely out of the dark Plutonian mist. He was lugging something white and heavy over the ground toward the ship. The object dangled from his extended right arm and he was stopping constantly to ease it down on the rugose, gleaming soil.

He advanced in slow stages, the *Zil* lamp at the summit of his oxygen helmet illumining the ground about him for several yards in all directions. I turned abruptly to the pale, anxious girl by my side.

"He's come alive out of a death-trap," I said. "A fool and his luck—"

My voice was edged with bitter irony. I was tremendously relieved to see Miles again, but I didn't want Helen Torrey to make light of disci-

THE DWELLER IN OUTER DARKNESS

By FRANK BELKNAP LONG, JR.

Author of "We, the Invisible," "The Black Vortex," etc.

A Complete Novelet of Interplanetary Thrills

Miles was impaled on empty air

A Trans-Neptunian Expedition Flies Afoul of the Scourge of the Spaceways!

CHAPTER I

The Thing in the Tunnel

WHEN I looked through the stern observation window I could see Miles' tall form looming obscurely out of the dark Plutonian mist. He was lugging something white and heavy over the ground toward the ship. The object dangled from his extended right arm and he was stopping constantly to ease it down on the rugose, gleaming soil.

He advanced in slow stages, the *Zil* lamp at the summit of his oxygen helmet illumining the ground about him for several yards in all directions. I turned abruptly to the pale, anxious girl by my side.

"He's come alive out of a death-trap," I said. "A fool and his luck—"

My voice was edged with bitter irony. I was tremendously relieved to see Miles again, but I didn't want Helen Torrey to make light of discipline. If a glance could kill, her scornful dark eyes would have laid me out stiff and cold at the base of the observation window.

"He shows you up," she said, indignantly. "Your little cautious soul recoils from high adventure like a snail that's been tempted out of its shell and doesn't know how to get back."

"I promised your father I'd bring you back alive," I said, furiously. "Do you think this is a schoolgirl's picnic?"

"He isn't afraid of the unknown," she taunted. "You are."

"Of course I am," I flung back at her. "Some one has to watch the time-clock when it's ticking away nine hundred million miles beyond Neptune's orbit, on the coldest, bleakest planet in the Solar System. You seem to forget that we've exhausted our margin of safety."

"But Peter Miles said he'd explore the entire tunnel and get back in three hours," said the girl. "He's kept his promise. He's even brought back something extraordinary with him. A new

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Afoul of the Scourge of the Spaceways!

specimen."

Helen Torrey's eyes were shining exultantly. "Whatever it is, it dwarfs all the little primitive plant organisms we've collected so far."

I had to admit that Miles had made good use of his time. If he had really brought back something alive and larger than a spongogene fungus he had justified Helen Torrey's faith in him. But I didn't intend to let her suspect what was passing through my mind. Miles was a foolhardy showoff and the girl hero-worshipped the vainest, weakest side of his nature.

In the black Plutonian night his vanity had blossomed into a menacing, abnormal growth—more grotesque than any of the writhing vegetable organisms which reposed in specimen trays in the Aquila's cold-lighted laboratory. It had been goaded into bloom by night-black hair and lustrous brown eyes and a Cupid's bow mouth which was distinctly out of place on a female biologist.

I cursed the day I had allowed Helen Torrey to turn a first-rate scientist into a strutting showoff. James Torrey was a veteran spaceman, with a capacity for scientific detachment which had brought him world renown at the age of forty-three. But his daughter—

I cursed myself heartily for a fool and a lunatic. The girl was unaccustomed to the stern discipline of the spaceways. Her place was in a finishing school on Earth, with giggling, romantic nitwits of her own age.

JAMES TORREY'S broken leg had been the cause of my undoing. Torrey had organized the Trans-Neptunian Zoological and Botanical Survey and molded it to a pattern of safety by his foresight and planning. He had rationed the supplies, charted our interplanetary courses and cautioned us against recklessness and heroics. And then he had broken his leg.

Helen Torrey had appealed unworthily to her father's pride.

"A Torrey must be present when the gravity ports open on the cold glory of Sun's outermost progeniture," she had insisted, with the pseudo-intellectuality of the very young. "Dad, let me go. Mark will take care of me. Won't you, Mark?"

I had nodded, not realizing what I would be letting myself in for. I had nodded like a maniac, like a space-drunk Lothario. Her night-black hair and Cupid's bow mouth had addled my wits.

I was paying for it now. She despised me because I was cautious, not realizing that caution is the handmaiden of courage and the insignia on bravery's mail. She preferred to admire the showoff Miles, who explored cold, maze-like caves in darkness and regarded new specimens as more important than the safety of James Torrey's only, treasured "progeniture."

Miles was near the ship now, so near that his face was visible in the torrex glass window of his oxygen helmet. In the light from the lamp above, his features looked pinched and haggard. I didn't envy him the ordeal from which he had emerged. We had stumbled on the tunnel by accident the day before. A crystal-encrusted barrow leading deep into alien earth; so narrow that you had to squeeze your way through it, so low that you had to stoop to progress.

I had explored one hundred feet of it and backed out, jittery because something soft had plopped down on my shoulders and started to move across my back. I could feel the squirm of it through the serrated rubber of my space-suit.

I wouldn't repeat an experience like that for all the love-and-admiration light in all the eyes of all the women on Earth. The clutching soft thing dropped from me, or was scraped from my back by the low-arching roof of the tunnel before I squeezed free into Pluto's everlasting night.

Peter Miles had returned, vainglorious and puffed with conceit, in defiance of my better judgment and all my warnings.

"Three hours," I told him. "We're risking more than our lives. All our specimens, all we've accomplished on Uranus and Neptune, not to mention Jim Torrey's little lass. I'd like to put that last item across my knee, just to correct her dad's indulgence. But let-

ting her freeze and grow brittle would be inhumane."

Miles, being chivalrous, flushed and glared at me. I was compelled to cold-stare him into sense.

"Three hours. If you're not back by then I'll blast out the propulsion jets and leave you here to freeze in your own juices."

"I believe you would at that," he said.

I nodded grimly. "I jettisoned sentiment when we passed Mars' orbit," I said. "Heroics and science won't mix."

NOW I was watching him being heroic, approaching nearer and nearer to the ship, while Helen Torrey glared at me and admired him. It was a kind of secret, inner hell, but I didn't want her to know that.

He reached the ship at last and I saw his hand go out to manipulate the outer airlock control. I turned away from the window and, with an impatient shrug, moved sideward to the compression dial on the control panel, which would succor him when he passed through the inner airlock into the interior of the ship.

The compression dial would shut the airlock behind him and lift him buoyantly toward a reclining mattress while his heart did flip-flops. He'd lie there smiling, stripping off his space-suit in a reclining position while his heart adjusted itself to the change in solar pressure. Funny how they didn't know anything about the solar pressure factor in the years when Mars and Venus were terrestrial outposts and the cold, far planets seemed as remote as Betelgeuse.

They didn't know that when Sun's rays dwindled its electro-magnetic erraticism increased, and you got freak "pressure" effects far out in space, crazier than the sun-spotty auroras of Earth. On Pluto and Neptune you had to recline and rest up, while arteries hammered and your nerves did handsprings all over you.

I knew he'd be ascending the ladder from the basal airlock chamber in about ten minutes, so I gave Helen Torrey the last, satirical blast before I turned from the panel.

"I'd advise you to marry the lad," I said, "while you're congenial and well adjusted. Some day you'll grow up and he'll remember he's not Sir Galahad and the answer to a schoolgirl's prayer."

She was so angry she couldn't say anything. She just remained silent, but I could hear her draw in her breath sharply and I knew that there were daggers in her eyes pointed my way.

I toyed idly with dials and levers on the luminous control panel while I waited for Miles to join us. After about twelve minutes a faint humming sound arose on the opposite side of the chamber and a long panel slid back with rhythmic throbbings. Into the cold light stepped a tall man with curly blond hair and countenance that would have delighted Praxiteles back in Hellas. But though he had the face and figure of a Greek god his mind was that of a Twenty-first Century biologist when Helen Torrey wasn't making a monkey out of him.

He was wearing a black rubberized lounge suit which contrasted sharply with the leprous white object which accompanied him into the chamber. Perhaps "accompany" is a too lively verb. The thing was utterly impassive, immobile, and he was compelled to drag in through the panel with heaving exertions of his arms and shoulders.

When Helen Torrey saw it clearly her eyes widened in swift horror and a little gasp flew out of her throat. I simply stared, too startled and horrified to notice whether the almost human expression on the incredible thing's face was accidental or deliberate.

It was a huge, pale, rootlike thing shaped like a crippled dwarf. All shriveled and lopsided, with twisted limbs like creepers and a little, spade-shaped face with a jagged, red mouth-gash in it, and gimlet-point gleamings which looked like eyes.

IT had the desquamated look of a corpse that had been floating about in the ocean for six or seven days. Its entire body seemed shriveled, yet somehow flabby. The hue of the thing's flesh and the revolting condition of its trunk and limbs filled me with sick loathing. I thought of the pale, twisted root-man

sired by the mandrake plant, whom the ancients feared and shunned, and went cold all over.

Worse than any blasphemy of myth or legend was this twisted, leprous thing from a dead, cold world. Miles moved silently across the chamber, eased the horror down on the pilot's chair before the observation window. He turned slowly then, a grim smile on his lips.

Sitting in *my* chair before the window the hellish baroque was a mockery and an insult. But that nauseating jest of his riled me less than the spectacle of Helen Torrey, blind to reticence and shame, clinging tightly to Miles, murmuring words of tenderness as her arms encircled his shoulders.

"I was so afraid you'd lost your way," she almost sobbed. "You shouldn't have gone out there again. It was risking too much—"

"Now, now," he said, stroking her hair. "You're all wrought up over something that didn't amount to dithers. Just look at what I've brought back with me. An inhabitant of Pluto—revolting, but, Lord, will it set the world agog."

I was furious, but I stifled my fury. I crossed the chamber till I stood beside them, stood looking down at the twisted, rootshape at close range.

"Is it dead?" I asked.

Miles nodded. "I think so. It's stiff, and cold. It's either dead or frozen. Did you ever see anything so horrible, so strange? It is the exact duplicate of something I dreamed about when I was a kid; when I used to pore over Jules Marta's 'Venusian Voyages.' Remember the shriveled ghoul things he thought he saw in the mist on the dark side?"

"Where did you find it?" I asked. I knew the answer, but I had to keep talking to forestall the gnawings of little green demons.

"About ten feet from the mouth of the tunnel," he said. "It was lying on the ground; I stumbled over it."

A sudden impulse seized me. I grasped the thing, lifted it from the chair. It was as cold as ice and its skin had a corrugated feel. My fingers thrilled strangely at the contact. I discovered that it was unbelievably heavy, its weight being out of all proportion to its size.

Whether it was animal, vegetable or mineral I could not tell. I only knew that it was incredibly loathsome, heavier than most metals—a thing of horror, of madness. I eased it down on the floor, swung into the chair before the observation window.

I looked out into the black, cold Plutonian night. Not a glimmer of radiance illumined that dead world of sinister tunnels and rugose plains. The great Sun spun too far away to warm and revivify. All was emptiness out there, chill desolation, a web of fearful menace which resented encroachments. We were little quivering homunculi adrift in measureless oceans of space.

CHAPTER II

The Space Raider

WE had alighted suicidally on the farthest flung of Sun's gas-tidal brood. Guardian of the outer darkness, frigid Pluto did not swing swiftly about the solar disk. Once in 249 years it patroled the bleak and awful void which even watery Neptune shunned. Illumed by Delta and the long-period comets' trail it pursued its lonely, solitary round.

Meteors it tolerated and all the tenuous, glowing debris of space. Only the little protoplasmic spawn of Earth was unwelcome here. We were encroachments undreamed of when two great fiery Suns converged in the dim, holocaustic millenniums before the terrestrial globe was brought to birth. We were solar biproducts irritating and presumptuous; palpitant specks of jellystuff daring the gulfs where cosmic flames once roared.

I didn't warn Miles and Helen Torrey that I was about to blast out the propulsion jets. I simply leaned sideward toward the control panel, manipulated dials and levers. The ship trembled, squirmed and moved forward across the dark plain. I saw the sparks

rise as its runners bit into the level soil.

Then the blast came. Within the chamber we were whirled about in a most uncomfortable manner. The pilot chair spun, and its swift revolutions brought dizziness to my brain as I glimpsed with disdain the waltzing figures of Miles and the girl. They were clinging to one another and going round and round. No harm would come of it, but I enjoyed their surprise and discomfort.

I should have warned them. They could have braced themselves and avoided that curious, dancing embrace. Now my jealousy had drawn them more closely together, defeated its own purpose.

I heard them scolding me. Poor fools, not to appreciate their good fortune. When the chair ceased whirling I looked out at Pluto receding, its black crust glowing a little now with diffuse starshine. In less than a minute we were clear of the thin, poisonous atmosphere, moving outward into frozen space and toward the glitter of starlands incalculable.

Minutes passed while I sat sullenly staring. Then I was aware of hands on my shoulder, a soft voice in my ear.

"I'm sorry, Mark. I said things that I did not really mean. You are more level-headed than Peter or I. Father would approve of what you did."

I twisted my head about, glanced up at her. She was standing so near that I could smell the fragrance of her night-black hair. Her slim, sweet body drew nearer still, brushed against my shoulder. Behind her Miles was standing, a friendly smile on his Greek-god's face.

Their magnanimity was more torturing than continued defiance would have been. I set my lips grimly and lowered my gaze. I stared out again at the far-flung constellations, consumed with self-pity, feeling lonelier than an island universe.

The Raider's ship swam so suddenly into view that it conveyed the illusion of a shooting star miraculously appearing in the gasless ether. Out of the star-hung abyss it loomed gigantically, its orange and white tail-lights brilliantly agleam.

A cry of amazement and horror ripped from the lips of the girl behind me. She flung herself forward till her face was within a foot of the crystal-clear quartz.

"It's Delcha's ship," she gasped, clutching my arm. "There's no mistaking it. Look at its bow, the stern-lights—"

I NODDED grimly. "It's either Delcha or his ghost," I said, looking down at her as I spoke, conscious of a stabbing relief that we were caught up by a pulsing urgency of terror, and menace, that all about us glowed the bright eyes of danger. Danger killed thought, submerged jealous impulses. Her white face awoke protective instincts, stirred emotions that were primal and selfless.

The Scourge of the Spaceways never dimmed his lights when he pursued the helpless. The stern of his massive, wedge-shaped craft always flaunted orange and white in predatory brilliance. Yet it seemed incredible that he had departed so far from the charted spaceways on a predatory quest.

All the rich cargo ships hugged the solar hub close to the inner planets. Only a few reckless adventurers in solo craft, and insane scientific zanies like us ventured beyond Neptune and Uranus. In the outer gulf that vicious, brutal plunderer could have expected no windfall.

Yet he was obviously pursuing us. As I stared in stunned horror at the great zigzagging craft I saw signal lights flash out in the airless ether. He was moving obliquely toward us, in sinister etheric tacks, showing at times a full broad-side of rotor guns and flashing tail-lights, and then swinging about until only the tapering dark snoot of his formidable prow was visible.

Helen Torrey interpreted the signals as they flared and vanished, her voice tremulous with terror.

"He says—stop accelerating. Strip off your fuel-sheets, bank your sequence-jets. Cut your speed to his speed. He wishes to board us.

"We'll see him in frozen hell first!" roared a voice behind me.

"No, no!" Helen cried instantly. "We

must obey him. A broadside of rotor guns would smash us to atoms."

She raised her face to mine, her eyes scared and pleading. I nodded, and clasped her little cold hand. I held her fingers tightly.

"We'll do as he says," I rapped out, for the benefit of the reckless madman behind me. "Any other course would be suicidal folly. Do you think that Delcha cares a hoot where we'll see him?"

I swung toward the control panel then, and did some swift manipulating. Miles swore at me, but I ignored him. I had promised Helen's father I would bring her back alive. I knew even better than she what a rotor blast could do.

Rotor guns swung little spinning cubes of metal about in a centrifuge until they acquired an internal pressure millions of times that of gravity. When rotor guns broadsided, a little, ominous *pouf* was followed by a desecration of stable matter which was hellish, absolute.

The rotor projectiles blasted everything in their path, consumed metals, reduced all solids to inert ash. They tore through quivering flesh and destroyed it in an instant; tore through frozen space and arrested the molecular flow of every diffuse element, every tenuous gas.

Helen Torrey was never so lovely as when she crouched beside my chair while the *Aquila* slowed, her face white and quivering, her slim body tremulous with suspense and despair.

THE RAIDER continued to signal as he drew near to us across the void. He painted ugly pictures in flashes of flame. We would die, he signaled, if we attempted to resist or trick him when our ships met in space. We would die horribly, screaming, in torments if we disobeyed him even in little things.

Behind me Miles was pacing furiously back and forth. He had a reckless nature, but the naivete of a schoolboy when reality closed too tightly about him and set to work on him with tooth and claw. I knew that if we did not handle Delcha with deceptive gloves he would destroy us utterly. I knew that we would have to be very sly before we struck. The alternative was an ominous *pouf*—followed by a desecration of stable matter, of quivering flesh.

We had perhaps ten minutes in which to prepare for war on Delcha's terms. War grim, relentless—and waged with deception's cloak. I descended swiftly from the pilot chair, pressed Helen Torrey's arm reassuringly. I faced Miles, the blusterer.

"Go into the instrument room and get me a granule projectile belt," I said. "Strap on a protective shield while you're about it. And bring a shield with you for Helen."

Miles' eyes flared. "You're going to ray him, eh? Without his suspecting? Good! I'm with you."

He turned, strode from the chamber. I went back to the observation window and watched the Raider coming abreast of us. His signal lights were flashing out directions pursuant to the grim and perilous task of making contact in the interplanetary night. I helped Delcha by obeying him implicitly, my fingers moving over the control panel with lightning dispatch.

Miles returned an instant before the two ships met in the void and a vibration went through us more ominous than a trump of doom. I locked the controls a little to the left of equilibrium center and descended from the chair again. I stripped off my space suit and commanded Helen Torrey to do likewise.

She obeyed, flushing a little as the cold light explored her undraped limbs.

I tossed her the granule-refracting belt. "Strap it on," I said. "Tight."

Her fingers fumbled with the lock of the massive contrivance while she stood shivering, and three-fourths unclothed. Miles was considerate enough to look the other way. I had to watch her to make certain she got the belt adjusted right. I cursed the false modesty which made me feel apologetic while I stared.

"Hurry," I said, strapping on my own infinitely more sinister belt which projected granules in diffuse, lethal waves.

Granules. The tiniest components of the atom, three billion times smaller than electrons and more deadly when

projected in diffuse mass than all the positrons in all the blast tubes on Earth.

A new and ghastly weapon was the granule projectile belt. Perfected less than a month before we left Earth, the secret of its searing, blasting charge was as yet unfamiliar to the wolves and vultures of the spaceways.

I RECLOTHED myself quickly, loosening my lounge suit a little about the waist to conceal the death that lurked beneath. When Helen Torrey slipped again into her tunic she was trembling all over.

To steady her I addressed her sternly. "Turn around," I said. "Walk—slowly now."

I inspected her critically as she obeyed. Her slim form seemed as slim as before and I was thankful that the refracting belt, though massive, was less cumbersome than the girdle which encircled my waist. No one would suspect that she was mechanically encumbered and less lithe than a sylph of Arcady. As for Miles, his Greek-god's body showed no slightest bulge.

"When he comes into the chamber," I said, "strive to look panicky. Pretend you're scared right down to your soles."

"It will be a bitter pill to swallow," muttered Miles. "It will stick in my gullet."

"Better a pill in your gullet than a *daunt* bullet in your brain," I said.

He started to reply but before irate words could cluster on his tongue the door panel behind him swung open with a faint, vibratory thrumming and Delcha the Raider advanced cautiously into the chamber.

CHAPTER III

Checkmated

THERE was nothing formidable about the space-pirate's appearance. He was below medium height and had a mild, almost scholarly face. His hair was mouse-colored, his nose small and straight, his mouth small and crooked. He was frailly built and his complexion was red and white like a girl's.

Only his eyes were sinister. Cold green orbs that surveyed us swiftly and mercilessly from the doorway while the smallest mouth I had ever seen on a man puckered into a pouting smirk.

He wore a rust-colored pilot's jacket of seamless latex cloth, tight-fitting trousers and high solar boots. His hands were slim and heavily veined and long nails curved from his twisted fingers. Long ago Delcha's ancestors had worn their nails thus, as befitted Manchus of princely rank. In an age when science dared the spaceways this undersized atavism from the remorseless, predatory East still flaunted the badge of his ancient caste and culture. His Eurasian origin would otherwise have passed unnoticed; for his features and complexion were not those of an Oriental.

I noticed his hands particularly because the positron blast tubes which gleamed in them were pointed my way. The little marauder was not unaccompanied. Behind him towered a black-clad Negro with flaring nostrils and a narrow, primitive skull. He was smiling malignly. Hovering about his decayed yellow teeth was the evilest smile I had ever seen on a human face.

The space-pirate's voice was soft and low-pitched, but an undercurrent of chilling menace seemed to flow through it.

"Who are you?" he demanded.

"Mark Banner," I replied. "I'm a citizen of the United States. We haven't any ores or anything that would interest you."

Delcha's cold eyes narrowed. His gaze passed speculatively to Helen Torrey, who was swaying tremulously by Miles' side. Miles had put his arm about her waist protectively and when Delcha looked at her his face paled.

The little Eurasian shrugged and returned his eyes to my face. They were still as cold as ice.

"Your friend would like to kill me," he said. "He has a nasty temper." He puckered his little mouth irritably. "And you—you're presuming, sir. I am very much interested in this ship."

"But why—"

"I will not answer questions," rasped Delcha. "I have no time for that. I will ask questions and you will answer them."

He turned to the black giant behind him. "Your breath is foul, Leuca," he snarled. "Stop breathing in my face."

The malign smile vanished from the Negro's lips. He trembled and edged back apologetically until his massive shoulders blocked the open doorway.

"If you're not an ore-ship," Delcha said, "why are you risking your necks out here? Where did you embark from? Where are you bound?"

I decided not to lie to him. Lying would have been futile anyway.

"We're scientists," I said. "This ship was charted by a member of the Smithsonian Institute. We took off from San Francisco six weeks ago and refueled in Alpha City, Venus. We're out here on a collecting mission. Our cargo wouldn't interest you. We've some primitive plants in cultures and that thing there—"

I GESTURED toward the horror from Pluto, forgotten by all of us until now. It lay in a crumpled heap on the floor beneath the pilot's chair. It had fallen behind a curving gamma-screen of transparent uradon which arched above it like a protective shell.

Delcha's eyes followed my pointing finger. I saw little bright flames of amazement leap and dance in their frigid depths. For a moment he stared, while the flames swelled. Then the ice in his pupils put the awe-and-wonder light out as swiftly as it had risen.

"You found that on Pluto?"

I nodded.

"It looks exactly like somebody I knew," said Delcha. "It looks like Frederick Willis. Willis was one of my men until he started disputing my orders. I stripped off his space-suit and hung him outside a gravity port. He looked exactly like that when I pulled him in."

"That thing never was a man," I said.

"No? Well, perhaps not. But you'll look like that too if you've lied to me."

"I haven't lied," I said.

"Very well. I want your ship, Banner. I'm taking it over. You're going to pilot it back to Venus."

"Why Venus?" I asked.

His mouth puckered again. "I will not answer questions, Banner." For an instant he stared at me, basilisk-eyed. Then he shrugged. "I've friends on Venus. They'll help me build a new ship and bribe the interplanetary if it gets too nosey. We had a costly accident between Jupiter and Saturn. We contracted metal-rot. Don't know what caused it—radioactive meteor perhaps. My ship's going to pieces fast. In two or three days it will be a leprous shell; corroded, worthless."

"You mean you're cutting your ship adrift—abandoning it?"

"I've already abandoned it, Banner. It's drifting in toward Sun, a derelict. My men are all on this ship."

For the first time a smile flickered across his small-featured face. It was only a smile by courtesy. It was venomous, a twisted, leering smirk.

"It's now or never," I thought.

I edged a little away from him, my hand slipping to my belt. If he noticed the movement, he gave no sign. The blast tubes in his hands were trained on me, but I knew I'd be safe enough and that Helen Torrey and Miles would remain unscathed. The refracting belts had built up an invisible force-screen about them.

The process took perhaps five minutes. The safety belts had started functioning before Delcha entered the chamber. You slipped the adjuster clip into place and the force beam did the rest. Helen and Miles were safer than safe.

I let my hand glide slowly waistward till it rested on a little projecting knob in the middle of the belt. Suddenly, vigorously, I compressed my fingers.

There was no sound at all as the granule death moved from me across the chamber. The air between us did not even quiver. My heart leaped up wildly and started hammering. Yet Delcha did not tremble or vanish. He simply stood still while the infra-atomic barrage enveloped him, the blast tubes unmoving in his clawlike fingers, his little crooked mouth malignly askew.

MILES cried out in wild alarm. He had seen me press upon the belt and when Delcha did not vanish utter horror engulfed him. Yet the belt had functioned. Inexplicably it had passed Delcha by and enveloped the body of the big Negro. Behind the little space-pirate's unmoving form a mountain of human flesh dissolved.

Swiftly the black giant's narrow skull and massive torso became a mountain of red jelly which dissolved and passed downward over limbs that jerked in erratic anguish. There was an instant when the great form remained erect in the cold light, a writhing, liquescent mass, a disintegrating horror without definite form. Then it sank into a loathsome dark mound which glistened as it spread outward upon the floor and drooled mucilaginously away.

Warned by my appalled gaze, Delcha swung about and stared intently down at the wet, glistening horror. The muscles of his jaw jerked. When he swung back toward us again his face was a livid mass of fury. The little mouth was purplish, convulsed.

"A new weapon, Banner?" he said, in a voice so calm that it struck terror to my heart.

I nodded, feeling, besides horror, the sick, sillyish emotions of a schoolboy caught stealing apples. Funny how even in moments like that you'll feel embarrassment and chagrin. I had blundered grievously and Delcha knew it.

"There are so many new inventions in the laboratories," he said. "On Earth, on Venus, even on Mars. The old, sub-atomic blast tubes are constantly being superseded by newer, deadlier weapons. I have a friend on Mars who forewarned me. He invented for my protection an atomic ray shield so impregnable it will resist a second-degree positron blast at pointblank range."

His tongue came out and caressed his puckered lips. His teeth flashed in the cold light.

"Too bad, Banner. You are wearing a ray-gun of some sort under your lounge suit?"

"A granule belt," I said. "You are wearing a stout shield, Delcha."

He nodded. "Undoubtedly. But you didn't know that when you sought to destroy my brain. It is a realistic brain, Banner. It eschews sentiment. Banner, I am going to kill you. You will pilot the ship back and then—" He shrugged.

His eyes passed to Helen Torrey, lingered for a moment on her white face. "The young lady has a peculiar beauty," he said. "It appeals to me. It stirs something very primitive in me."

Miles was standing by the bulkhead opposite the control panel, his arm still about Helen Torrey's waist. Suddenly he removed his arm, and stepped close to Delcha.

"You fool!" he said. "You incredible blind fool! This man will be worth nothing to you dead. Alive—" He shrugged eloquently.

Delcha's eyes narrowed. "What do you mean?" he said.

I was wondering the same thing. I was watching Miles closely, at a loss to explain the sudden change in him. Then I noticed something which filled me with amazement and incredulous revulsion.

MILES was trembling. His lips were utterly bloodless, and unmistakably fright was stenciled on every lineament of his white, twitching face.

"Banner is not a poor man," he said. "He does not pursue science for gain. He is a wealthy amateur, a dilettante. If you held him for ransom you would have the wherewithal to build a new ship." He hesitated an instant, glancing swiftly at me. Then he said: "I could act as an intermediary, Delcha. I could return to Earth, secure five thousand mezos of ransom and transmit the fund through secret channels, and with the aid of emissaries acting on your behalf."

Helen Torrey gasped. I retreated a pace and stared at Miles with wide eyes. His proposal was ingenious enough and might have saved my life. I am not sure that it was prompted wholly by disloyalty. But emanating as it did from an obviously frightened man, a man bent on saving his own skin at whatever cost, it was perilously

close to a betrayal of trust. A sudden, furious resentment surged up in me, blinding me to caution.

"He is lying, Delcha," I said. "It is true that I have a little property, but it is heavily entailed. I could not raise five hundred mezos."

Delcha was apparently a shrewd judge of human nature. Something in my tone seemed to convince him that I was telling the truth. He fixed his gaze relentlessly on Miles, his eyes glistening with an almost reptilian malignancy.

"You will die, too," he said.

Miles lost his head completely then. He sprang suddenly and violently at Delcha, his fingers splayed, his face redder than a Saturnian crater-wort. He moved so quickly that the Raider had no time to recoil or leap aside. For an instant I thought that Miles' big hands would reach and encircle the Raider's throat. But when I perceived that the hands of the little Eurasian were moving simultaneously I knew that Miles had blundered badly.

The two men were within six feet of one another when the Raider's blast weapon spat its paralyzing charge. Miles was hurled violently backward and impaled on empty air. One instant he was a charging figure of fury; the next he was swaying backward with no visible support, his head lolling, his limbs distorted and jerking convulsively.

The force current whirled him furiously about and held him in aerial suspension until its fluctuating energies waned. Gradually as the beam diffused itself about the chamber the stricken man sank with slow quiverings to the floor and lay in a crumpled heap, his limbs still twitching and trembling, his face a twisted horror.

CHAPTER IV

Creeper in the Darkness

SWIFT horror engulfed me when I realized what had prompted Miles' wild leap. He had thought himself immune to danger, protected from the Raider's blast-tube by the granule refracting belt at his waist. In his fury, he had forgotten that the protective screen was impermanent, that its energies dwindled and waned when the transverse electro - magnetic waves which poured from it were reabsorbed and dissipated by the atom-scattered discharge tube at the base of the belt.

The belt recharged itself automatically until the emitted waves diminished in length and intensity; then it was as worthless as a burnt-out, alpha-particle blast-tube. Its "life-span" seldom exceeded fifteen or twenty minutes.

Swiftly I leaped to Helen Torrey's side, concern for her safety blotting out all else. She swayed toward me, her face ashen. But before I could catch her in my arms the little Eurasian blasted again. Instantly the girl's white face was swallowed up in blinding flame.

I had a sensation of flight upward through great, spinning orbs that shone with a fiery incandescence as they drew holocaustically into their bright immensities the fragments of a world which had burst inside my skull. I became that shattered world and the suns of space were devouring entities intent on my annihilation.

Awful was my sense of *lostness* in that bright conflux of cosmic forces. Then slowly the parade of Gargantuan, fiery suns receded and vanished. Oblivion came rushing in upon me, submerging my faculties until I ceased to dream. . . .

Consciousnss returned in slow, painful stages. I was aware of a vast field of darkness flecked with throbbing points of silvery light. I was aware of pressure on my limbs and thighs and a constriction about my waist which increased tenfold when I tried to move.

Obscurely familiar objects impinged on my returning vision. I could distinguish a square of illumined metal and the diffuse radiance of starglow on inches-thick quartz. A minute passed agonizingly. Then my faculties steadied, and memory returned with a rush. I stiffened in sudden terror.

I was bound securely to the pilot

chair. My thighs and legs were lashed to the seat of the chair by cords which passed downward over its mushroom-shaped base; my waist was confined by double cords which passed around the back of the chair and exerted an agonizing pressure when my body tensed. Only my hands and arms were free.

Before me stretched the star-studded abyss. I was facing the observation window, gazing outward into the gulfs between the worlds. A little to my right glowed the illumed control panel. Behind me darkness reigned. The chamber was in Stygian darkness save for the diffuse, wavering radiance which bathed the objects immediately about me.

I was sure of this because the light walled into blackness on both sides of me when I twisted my head about and tried to penetrate the gloom. I remembered Helen Torrey's white face, Miles' twisted form. Frantically I started fumbling with my fingers at the cords which held me.

"I wouldn't do that, Banner," a voice behind me said. "I have left your hands free because you will need them to move the dials on the switchboard. You will be my pilot until we reach Venus. Then you will be your own pilot forever."

A CHILL went through me. I recognized Delcha's voice though it was pitched to an unusual key by a sinister kind of exultation.

"Yes, Banner," he resumed, after a pause, "you will wander alone in frozen space until you grow weary of movement and change. All the planets will know you, all the stars. Your frozen body will float forever in the lightless ether, self-piloted, immortal."

"Damn you!" I muttered, between clenched teeth. "What have you done to Miss Torrey?"

He began to chuckle maliciously. "She will not share your dismal fate, Banner. She will know comfort and warmth. The white fire of my love will enfold her." His voice grew suddenly harsh. "No more idle talk, Banner. The controls are set at equilibrium center. Change them. It is time we were accelerating."

"And if I refuse?" I said.

"I'll blast you with more than a paralyzing beam," he replied.

My only alternative was to obey. I had more than my own safety to consider. Behind me I could hear Delcha's harsh breathing. I had no way of knowing whether he was alone in the chamber. He had mentioned a crew, but I could only speculate as to the number of his companions. Probably a score of sinister ruffians who would stop at nothing to get safely back within the zone of the inner planets.

Slowly, reluctantly, my hand moved out toward a dial lock on the luminous control panel. In grim despair I grasped the wedge-shaped mechanism and hesitated with my fingers flexed.

For a few seconds I had been aware of a dull scuffling sound in the darkness, obscurely audible above Delcha's malign chuckles. But I did not associate it with another presence until I heard Delcha draw in his breath sharply and cry out in shrill terror.

It was a ghastly cry which came from Delcha's throat. It was freighted with agony and horror and it seemed the more awful because it had started on a note of mere surprise and swelled into the cry of a man in the last extremity of mortal anguish.

The scream was not repeated. I heard labored breathing and a hideous sound as of tearing human flesh. Then—silence.

I withdrew my hand from the control panel, spoke Delcha's name. A faint, rustling murmur answered me. It was not a human sound at all. It was like something heard obscurely in dreams when the subconscious throws tendrils down to its murkiest depths and reptile shapes crawl repulsively through the black night of the mind.

I set to work feverishly on the cords which bound me. My fingers tore at the tight, complicated knots while my heart began a furious hammering. My left leg came first; then my right. I got the cords off my middle next; sagged for an instant in the chair before I sprang from it in blind terror. I went down on the floor, on my hands and knees. I stumbled erect, staggered

across the chamber through the heavy darkness toward the cold light switch.

I was trembling all over when I turned the light on. The darkness ebbed from me; swept in a receding blanket across the chamber. Familiar objects leaped into view—a stellar chart encased in metal, an etherometer on its massive pedestal, the sliding door panel through which Delcha had come.

I HAD a premonition of what I would see an instant before I lowered my gaze to the floor. But when my eyes actually rested on Delcha my spine shuddered and I was compelled to choke down a scream.

The little Eurasian was lying on his back, his arms outflung, his head thrown back, his small body arched in torment. His face was purplish and his eyeballs protruded. Twined tightly about him, so tightly that its tendril-limbs were stained with blood pressed from lacerated human flesh, was the fungus-white rootshape from the Plutonian caves. Apparently the curving gamma-screen of transparent uradon behind which it had been lying had protected it from the granule barrage.

The head of the malign thing was half buried in the Raider's throat. Only the back of its head was visible, but it was sickeningly evident that its mouth had been loathsomely busy. It had gorged itself on Delcha's flesh. It had feasted — vampirishly, ghoulishly in the darkness.

Now it was unmoving and somnolent and inert. It had fallen once more into a hibernating trance, a hellish catalepsis from which only darkness could arouse it.

Darkness. Life source of this Plutonian plant-thing, as necessary to its vital functioning as was sunlight to the plants of Earth. The key to the mystery, which was large and easily grasped, unlocked gates of speculation in my mind. I understood only too well.

On cold, frigid Pluto, cut off from the radiance of the great Life-Giver, evolution had proceeded at a grotesque tangent. Natural selection had placed a premium on movement in darkness. Only organisms sensitive to the cold and darkness of far outer space could survive and flourish in such a world.

Something in the very cell structure of this loathsome plant-animal—for such I conceived it to be—responded to a negation of light. It moved and slayed and feasted in utter darkness, like certain cannibalistic plants of Earth. And from the bright, sun-warmed worlds a blundering shape of deprayed flesh, a vulture amongst kindlier bipeds unwittingly had stirred its sinister hunger.

Delcha had chosen to watch me in darkness, concealed and sneering while I sat imprisoned in a metal chair and obeyed his relentless commands. For a few moments of gloating triumph he had paid with his life. He had watched me s t r u g g l i n g helplessly, limned against the stars of space. He had watched me with sardonic glee and taunted me with measureless malice. But now the helpless and protesting star-gazer was free once more and the little Eurasian was a lump of mangled flesh.

"Mark, Mark, are you all right? What has happened?"

The voice came from the open door-panel in front of me. Startled, I raised my eyes and stared in incredulous amazement. Helen Torrey was standing in the doorway, swaying and shivering and looking from me to the gruesome thing on the floor and back to me again. Her face was bloodless; her eyes wide and luminous with concern.

Suddenly she staggered toward me across the chamber. This time I caught her, for there was no paralyzing beam to come between us. Caught her, held her.

"Of course we're all right," I said, as I led her gently away from the horror toward the glimmering stars of space. "You and I and Miles. It was merely a paralyzing beam, a fifth-degree positron blast. And now Delcha will never blast again."

"I know," she said. "I know, darling."

MY heart missed a beat. I took her by the shoulders and shook her.

"You're still a little confused," I said. "I'm not Miles at all. I'm Mark Ban-

ner. Mark—"

She nodded. "I know," she repeated. "I know who you are, darling. You are Mark Banner, the man I love. You—you are the genuine, Mark. Trustworthy, reliable, cool-headed—not a posturing fool; not a—coward. But even if you were like Miles I would still love you."

It was incredible. I felt a throbbing glow rising to my head. Her face was coming closer, and all at once our lips met, merged. I kissed her again and again. She clung to me and suddenly she burst into tears.

"A girl like me never knows her own mind," she sobbed. "Never, never, darling. I loved you back on Earth, all the time—"

I was so bewildered I was hardly aware that an interloper had entered the chamber. But when I saw Miles, saw his face, a wave of contrition surged over me.

The poor devil looked hard hit. He stood staring sombrely at us, infinite pain in his gaze, his jaw grimly set. Then suddenly he was gone. One minute he was standing in the doorway, a figure of utter dejection. Then the cold light streamed down on a square of empty blackness.

"I don't understand," I murmured to Helen. "Miles, you—Delcha's men—"

"Delcha had no men," she said. "He told me before he paralyzed me with the positron beam. His men mutinied when his ship developed metal rot. They escaped in a little emergency craft which Delcha carried as a precautionary measure, and he was compelled to navigate the ship alone. Only the Negro remained faithful."

"He was bluffing all the time, then," I said.

Helen Torrey nodded. "Yes. He wasn't an experienced pilot and he ran into trouble right after his men left. He lost his bearings, got caught up in an ether vortex and was carried out beyond Neptune's orbit."

"But how did you and Miles get free? Didn't he tie you up?"

"He tied us and carried us down to the laboratory," said Helen. "He didn't know how good Peter is at knots. Peter's like that magician—Houdini I think his name was—who was almost a legendary figure back in the Twentieth Century. As soon as the paralysis wore off Peter freed us both."

I looked at her incredulously. Her face was misty with tears and the tenderest light I had ever seen in a woman's eyes shone in the depths of her pupils. But that light wasn't for Miles at all. It was for me. Entirely for me.

And suddenly as I stared her face bobbed up close and she was kissing me again. Or I was kissing her. It's hard to decide a matter like that with any accuracy when you're really in love.

AN INVISIBLE ENEMY DEFIES MANKIND!

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THE SCOURGE BELOW

A Novelet of Subterranean Rule

By SAM MERWIN, JR.

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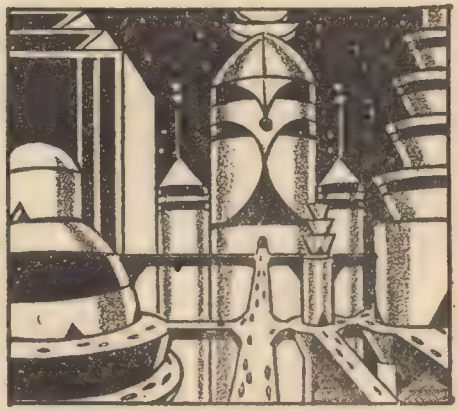
NEXT ISSUE



IF INSECTS RULED HUMANITY!

BY JACK BINDER

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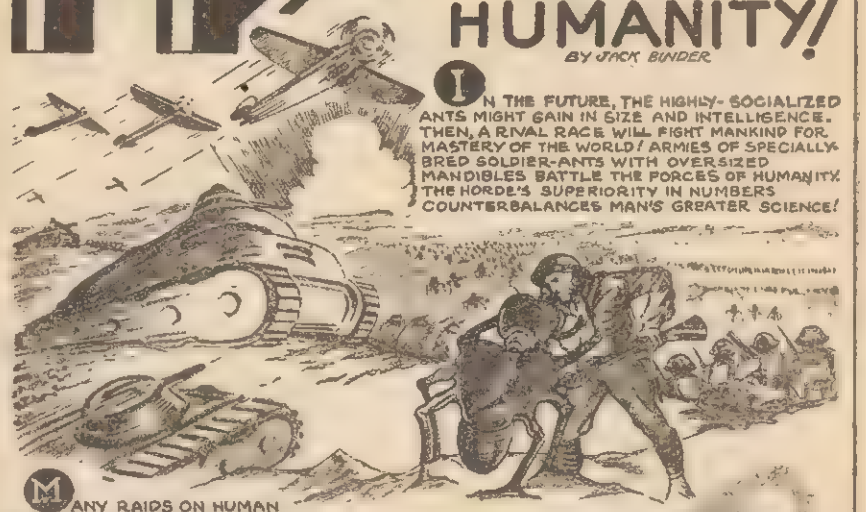

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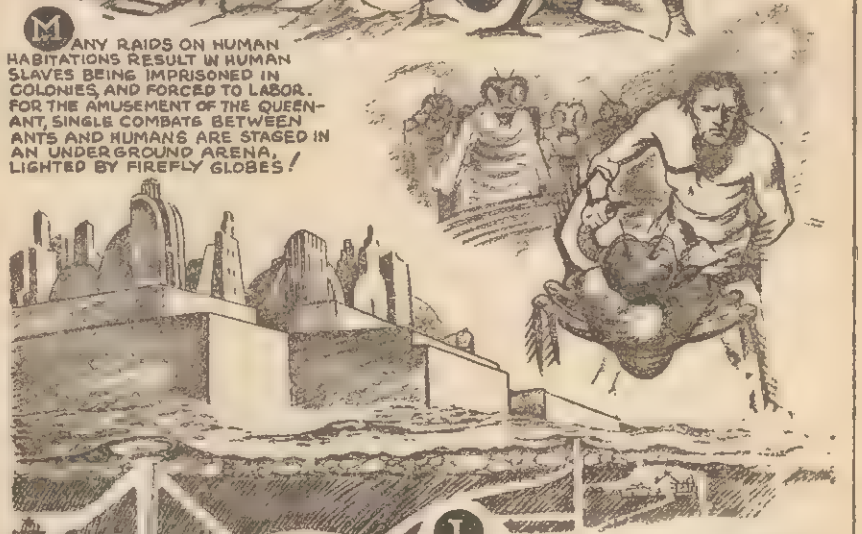

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SUN MENACED EARTH

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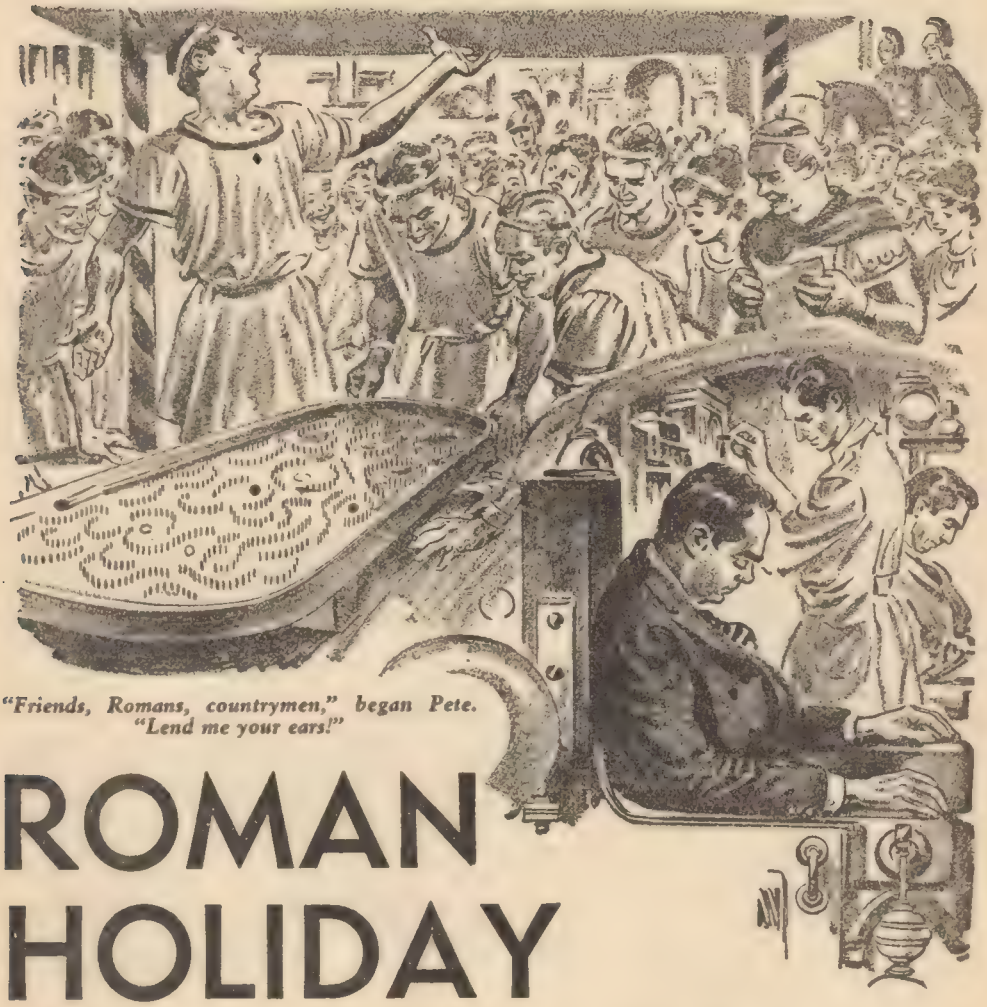
SUN MENACED EARTH

Pete Manx Speeds Back Twenty Centuries in Time to Find You Can't Build Rome in One Day!



"Friends, Romans, countrymen," began Pete. "Lend me your ears!"

ROMAN HOLIDAY

By KELVIN KENT

PETE MANX was nervous. Spieling before a sideshow or working the shell game on some sucker, he'd have felt at home. But the apparatus in Dr. Mayhem's laboratory bothered him. Power cables, massive insulators, tubes, coils—huh-uh! Ever since Pete's brother-in-law had taken the hot squat in Joliet, Pete himself had developed a definite allergy to electricity.

He tipped his derby back on his bullet head, squinting at Mayhem.

"Now look," he said. "I know my rights; I ain't no guinea pig. For a hundred bucks I'll do a lot, but—"

"Shush," frowned the doctor. "You won't be hurt. Just wait here, Mr. Manx, till I give the word."

Mayhem's agile, wizened figure disappeared behind a curtain. A spatter of applause greeted him as he appeared on an improvised rostrum in a screened-off portion of his laboratory.

Pete tiptoed to the curtain and parted it. He glimpsed a dozen young men—college kids—and a large, amorphous gentleman who wore with dignity pince-nez and a who-the-devil-are-you air.

"Nasty looking customer," Pete told himself. "Wonder what this is all about? The doc wouldn't give me a hundred fish for nothing."

Mayhem commenced to talk.

"Gentlemen, I regret keeping you waiting. I invited you here to witness a little experiment. Professor Aker"—he bowed, with a faintly ironic leer, to the man with the pince-nez—"has honored me by disagreeing with a certain theory I postulated. He maintains that you and I, gentlemen, are—um—cogs."

Pete grinned as he saw the large gentleman bristle, then rise.

"Dr. Mayhem," rumbled Professor Aker, "I am at a loss to know why I was summoned to your laboratory. But now that I am here, I feel that it would be expedient to explain my premise."

"Here we go again," whispered an irreverent freshman. Professor Aker had, in the university, a definite reputation as a bore.

"Ahem," said the professor. "It was my contention that our present-day civilization is such a complex organization, with each individual so dependent upon many other individuals for existence, that a man today receives no practical education whatsoever. He is, as I said, merely a cog. In other words, he knows only a limited phase of whatever trade or profession he follows."

"And," prodded Mayhem, "you said that if a modern man were suddenly transported back to ancient Rome, for instance—"

"Ah, yes, yes. Despite his apparent advantage of centuries of knowledge, he would be utterly helpless. He would starve for want of ability to make something useful. An office worker—what could he do? Nothing. Could an automobile worker who spends his days bolting on fenders support himself in Rome?

"Or take an ordinary jeweler. Could he make the parts of the watches he repairs every day? Of course not! He couldn't build a clock to save his soul! I contend that the only type of man with any chance of making a financial success, if cast back into the past, is the man of science. Science alone can defeat adverse environment."

Mayhem chuckled unpleasantly.

"So you say, repeatedly. But if you really *could* go back to Roman times, I wonder if you would still feel the same?"

Aker drew himself up.

"My dear Mayhem, I would revolutionize Roman standards of living, change the course of history, by the simple introduction of cheap power. Electricity. The history of civilization is, of course, the history of transportation. By introducing electricity and motors, I could—"

"Yes, yes. Familiar ground, Professor Aker. But you are soon to have a chance to put your theory to the test. I've built a time machine," said Mayhem with the simplicity of true genius. "No, don't argue. It's never been done before, I know. But then there's never been a Horatio Mayhem before. I can project you back into past time, and, unless you want to back down, I can send you temporarily to the days of ancient Rome."

"You are mad," Aker decided.

"Suit yourself. But I'd like to make a small wager. I need a few thousand dollars' worth of new equipment for my research—"

Aker reacted as department heads have reacted immemorially to such suggestions. "Outrageous! I have already told you I would not countenance such wanton expenditure."

"So," Mayhem spoke persuasively, "I'll bet with you. I'll send you and another man—an ordinary layman—back to Rome, and give you a certain period in which to prove your theory. If my man makes a bigger success than you, then you'll give me the equipment I want."

AKER purpled.

"What! Do you seriously—"

"Afraid?" taunted Mayhem.

Pete Manx, still watching surreptitiously, chuckled. Mayhem had maneuvered Aker behind the eight ball. With all those school kids making wise remarks and daring the old bloat to go through with his argument, Aker, pompous and sensitive, didn't dare back down now.

Aker glared around. "Afraid? Bah!"

he growled. "Of course not!" He sank down into his chair.

"Then you agree," Mayhem smiled. "Good! You may come out now, Mr. Manx."

Manx appeared from behind the curtain, waving a hand agreeably at the group. "Hiya," he grinned. "Just call me Pete."

"Who is this person?" Aker demanded.

"A gentleman I hired at the beach—a barker at one of the concessions, in fact. His chief virtues are a certain native shrewdness and a knowledge of Latin, a knowledge he shares with you, Professor. Naturally, when you go back to Rome, it is necessary to speak the Roman tongue."

"This—er—fellow speaks Latin?" Aker said dubiously.

"And why not?" came back Pete belligerently. "My old lady was a teacher in high school. Listen. *Omni Gallia divisa est—*"

"Not now," Mayhem interposed hastily. "But soon, perhaps. Now, the arrangement is clear, I trust. Professor Aker and Pete Manx will go back to Rome in my time machine, and will be given a certain period in which to achieve success. And if my man wins, Professor Aker will give me my equipment."

"Look here, Mayhem," Aker said uneasily. "This is poppycock. I'm getting out of here right now!"

"You are indeed," said the doctor. "Oh, my, yes! I took the precaution of wiring your chair so that it is a miniature time machine." He pressed a button. "Er—good luck, Professor."

He was, however, addressing what seemed to be a peculiarly repulsive-looking corpse. For Professor Aker's ample body had suddenly slumped in the chair, an expression of utter vacuity frozen on the beefy features.

"Don't be alarmed," the doctor called, his hands raised to quiet the audience. "He isn't harmed. It's merely a trance. His mind has been projected back in time."

"Hey, wait!" Pete Manx gulped. "That looks like the hot seat to me!"

"Pete, my boy, it's quite all right." Dr. Mayhem smiled. "Just sit here, if you please."

Pete squirmed.

Bang!

The inner consciousness of Pete Manx left his body, derby, checkered vest, and orange tie, to appear with startling abruptness in another time-sector. Pete went, however, in an erratic sort of way, much like a pendulum gathering momentum and swinging back and forth between ancient Rome and modern America.

The laboratory suddenly had vanished. Sunlight glared down on him instead. Yelling tradesmen stormed and chaffered. Tides of laden slaves surged among the booths of vegetable sellers and money changers. Then—

He was back in the laboratory—paralyzed! Unable to stir a muscle, wink an eyelash, or bridge a synapse, Pete stared blankly and listened to Dr. Mayhem speaking.

"Time, like space, is curved, revolving around a central time-consciousness. There the temporal sense of all men from the beginning to the end of things has its origin. We, gentlemen, are on the rim of the wheel, so to speak. If we could project ourselves to the hub and out again along another spoke, we would find ourselves in a different time. . . ."

Swish!

Rome!

A horseman pacing slowly along a narrow street, preceded by a gilded litter borne by slaves. Cries of *"Cave! Cave!"* Rough, fluent oaths of a bearded Gaul looming up near by.

Back again to the laboratory. Dr. Mayhem was still lecturing.

"They have both been mentally transported, while their bodies lie here in a state of trance, into the minds of two persons in the days of Rome's glory. Their consciousnesses were projected into the Time-center, and thence out again to a period known to us only as history. . . ."

PETE MANX went back to Rome and, this time, stayed there. Once more the hot Italian sunlight blazed down upon him. Odors of wine and olives and spices were strong in his

nostrils. For a moment the world swung dizzily about him; then suddenly something came violently in contact with his nose and he was precipitated full-length upon the Appian Way.

"Earthquake!" he gasped. "I ain't in Rome; I'm in California!"

A harsh voice spoke swift Latin words, and Pete recognized them. He sat up, feeling an odd awkwardness about his new body, and stared at a furry-bearded soldier who was shaking both fists and cursing.

"Purse-snatcher," the soldier roared, among other things, and expressed an intention of tearing Pete apart and scattering his revolting body from Viminal Hill to the Colosseum. "An honest soldier cannot be in Rome a day before some thief lifts his purse. What is thy name, dog?"

"Petus Manxus," replied Pete.

"Then arise, Manxus the thief, that I may smite you again."

This struck Pete as unsound advice, but he stood up nevertheless. A quick glance downward told him that he was dressed in a billowing white tunic like a night-gown; his feet, sandal-shod, were invisible to him. Apparently Pete's mind was inhabiting the body of some Roman who had just got himself into a peck of trouble.

Pete desperately fended for himself with ju-jutsu. His triumph was instantaneous. A twist of the wrist sent the Gaul spinning, whereupon Petus Manxus' two hundred and fifty pounds lit upon him in a running broad jump. The unfortunate soldier did not get up again, remaining flat on his back twitching and wheezing. Pete fled down the Via Appia until he was protected by a surging multitude of Gauls, Scythians, Britons—a potpourri of the world under Rome. Then, feeling himself unobserved, he withdrew into a vacant space behind a wine-seller's booth and sat down to rest and pant.

"So this is Rome," he muttered disparagingly. "Pew! Science is sure a funny thing."

But he had a job to do, and a rough-and-ready philosophy that softened life's knocks. So he carefully took stock of his possessions. They were not many. Under his tunic he wore a woolen under-garment that itched, and a leather pouch. In the pouch was a purse containing three lonely pieces of silver and a knife. Pete grunted. If he had been a thief up to now, he'd certainly been an unsuccessful one. He would have to start from scratch, and the only thing in his favor in this friendless world was the fact that there seemed to be hordes of suckers just begging to be plucked.

Wandering back into the busy square, Pete came at last to a vacant booth. In it was a sloping wooden table which had a two-inch curb all around. An idea glimmered into his brain.

He had no tools save for the knife in his pouch. But with this he set to work, humming under his breath, "Hold that Ti-ber! Hold that Tiber!" Carefully he marked off the slanting surface of the table with a pattern of ten dots. At each dot he painfully gouged a shallow depression in the soft wood. Then he whittled a number of tiny pegs and, below each depression, bored small holes into which he fitted the pegs. Above some of them he also distributed an occasional peg. On the right side of the board, paralleling the curb, he fitted another narrow wooden strip so that a channel extending almost to the top was formed.

AT the top, curving from side to side, he pegged in a semi-circular strip of stiff reed. Finally, at the base of the right-hand channel, he arranged a painfully-carved wooden plunger. He stepped back to survey his work.

"Crude," he sighed, "but good enough for a beginning." A gnawing in his middle was making itself felt; he was hungry. Hastily he went forth, surveying the Via Appia till he found three urchins playing marbles in a dusty corner. He traded his knife for the marbles.

Then he was ready. Petus Manxus returned to his booth, a cold feeling of excitement making him shiver a bit. He made an involuntary gesture to shove his derby further back on his head. He winced as plump fingers encountered a bald, pink dome.

Two soldiers were passing; Pete called to them. "Hey, you two! Want to see something new? C'mere."

The men approached.

"Well?"

The Emperor's latest amusement—" *Was* there an emperor? Apparently so, for the soldiers bent to examine the board with interest. "You, there! With the purple nightshirt! Come and see!"

Three men in purple togas frowningly approached. Attracted by the senators, others followed.

This was familiar stuff to Pete; he launched glibly forth into his spiel.

"Friends, Romans, countrymen!" he yelled. "Lend me your ears! I come here not to sell you something, but to fascinate and amuse you! Come see the Emperor's favorite game!"

"What is it called?" a paunchy senator took the bait.

"*Clavus pila!* Pin ball! Rich prizes to the skilful! This is not a game of chance, my friends, but a test of skill and skill alone. Step right up, folks, and keep your eye on the ball!"

The crowd surged up. Pete casually dropped one marble in the channel along the right side of the board, drew back the plunger, slammed it forward again. The ball shot up, followed the curving strip of stout reed, caromed off a nail, and began dribbling slowly down the board bounding off pegs, zigzagging, and eventually dropping into one of the holes.

"A Vestal Virgin!" Pete bellowed, and the onlookers noticed that each hole was labeled with a name. Six were Vestal Virgins; three were Senators; the one at the top was dubbed Caesar. "It's easy, folks! A Caesar, two Senators, and five Virgins wins you two sesterces. A Caesar, three Senators, and five Virgins wins you three sesterces. If you hit Caesar, three Senators, and all the Vestal Virgins you can take the board home with you. . . . Come one, come all!"

With uncanny accuracy, Manxus poured four more marbles into guide slot and fired, registering Caesar, two Senators, and one Out at the bottom of the board. In a trice the crowd was begging him to take their money, eager for a chance to play.

Pete took them one at a time, charging one sesterce per game, picking the marbles out of their resting places by hand after each game was finished. By a stroke of good fortune, the first two players each won a little; from then on there was no stopping the mob. By nightfall Manxus' pouch and both hands were stuffed with coins.

Smelly, inefficient oil lamps were brought out, but Pete vetoed further play that day. Somewhere in Rome there was a place that his body called home, but he naturally didn't know where it was. Instead, he took a room at an inn—the *Caupona Bacchius,* B. Bibulus, Proprietor—which reminded him in appearance and odor of any other beer joint back home with dollar-a-day rooms upstairs. But Pete didn't mind; he was already well on the road to becoming the slot-machine czar of Rome!

NEXT day he set up his outfit in the square at dawn. By making it a bit easier to win, he had customers lined up all the way around the square waiting to play *clavus pila.* By eleven o'clock he had broke a carpenter, who was so afraid to return home to his wife that Pete returned his money. The grateful carpenter gladly promised to build a dozen *clavus pila* boards of finest materials and deliver them to Pete's place at the inn.

By two o'clock a tax collector had gone down swinging, losing in addition to his own money, two hundred denarius' belonging to the government.

Eventually inn-keeper Bibulus was seduced by the insidious sight of a praetorian guardsman raking in his winnings. He came, played, and was conquered. Petus Manxus went home that evening with a partnership in the *Caupona Bacchius.*

Thenceforward the *clavus pila* rage rushed ahead on its own momentum. Pete set up the new tables in the inn, a dozen of them, and had Bibulus and his three fat daughters help regulate the play, take in the coins, watch the chiselers who tried to start their game over again while no one was looking,

and put down a stern foot when anyone was caught titling the board.

Within a week Pete was riding the streets in a sumptuous litter, wearing fur togas, and with a retinue of twenty slaves. All over Rome his *clavus pila* parlors were springing up like mushrooms.

Pete was smart. The more parlors he opened, the more his income. The more money he made, the more he could afford to lower the odds so everyone could win occasionally, working on a smaller percentage. And the more people won, the more they poured sesterces into the Manxus coffers.

"It's a vicious coicle," Pete grinned to Bibulus. "They actually beg me to take their dough!"

It was inevitable that Petus Manxus should look around for more worlds to conquer. He considered the idea of inventing roulette or tango, but vetoed it. That would require opening a new set of joints, and since he had all the gambling element playing pin-ball, the new games would just take some of the players from one racket to the other with no increase in intake. He looked into the theater situation briefly, but gave that up when he learned Rome had but two or three theaters, and they were the Emperor's own graft.

"Such a pity," Pete moaned cheerfully to the bewildered Bibulus. "What a push-over they woulda been for Bingo and Bank Nite!"

But politics—there was something in which Pete's experience would serve him well!

Pete scurried around among the influential Romans who were somewhat under obligation to him, because of *clavus pila* losses, and put on gentle pressure. He talked earnestly to the head of the flute-blowers' guild, to his friend the carpenter, to many others. And one week before election day, the moon rose on a Rome gone politically insane.

Rome was having her first political parade, under the auspices of Petus Manxus.

Leading the way, blowing and plucking away with all their might, was a weird orchestra; the instruments were flutes, lyres, and horns. Next came a group of Pete's intimates. Each carried a square poster, upthrust on a pole, which bobbed and twirled in the smoky light of torches and lamps.

"Manxus for Magistrate!" they proclaimed in large letters. "A New Deal for Romans!"

"Vote for Manxus, Old-line Republican! Bring Back Prosperity!"

"Seventy Sesterces Every Saturday for Each Citizen Over Sixty!"

THIS was followed by a gorgeously decorated litter carried by eight handsome slaves. Standing up inside, bowing and smiling to the crowd, was Pete. Behind came about a hundred paid retainers, all cheering mightily at the rate of one denarius per hour.

So, after a whirlwind campaign in which he advocated the Townsendum old-age retirement plan, conservatism, liberalism, and other incomprehensibles, Petus Manxus was returned magistrate, with the assistance of some sleight-of-hand at the polls. With Bibulus as chief adviser, Pete devoted himself to administering his office.

Things ran smoothly—too smoothly, according to Bibulus.

"The Emperor hasn't even asked you to make a will in his favor!" he worried. "Strange."

"So that's how he gets his rake-off eh?" Pete asked. "Just an old Roman custom. Y'know, I haven't even seen Claudius yet."

"Few do," Bibulus observed meaningly, "and most of them regret it. The Emperor's favor is dangerous to lose. Just the same, there's something strange about it. Are you sure you haven't a powerful friend at court?"

"Except for my uncle who is a Tammany alderman, no."

"Yet a woman has appeared often among the spectators when you are on the bench. A beautiful woman, veiled to the eyes—"

"Women," pronounced Pete, "is poison. Ixnay, Bibby. Have you got any news about the guy I'm lookin' for?" Ever since Pete's election he had been searching for the trail of his inadvertent companion into time, Professor Aker, who should have been somewhere in Rome. Until today, Bi-

bulus had brought no news.

Now, however, the former *caupo* twisted his face into a crumpled arrangement of wrinkles, intended to be a smile.

"I have learned of a wizard whose magic failed—a madman. He rushed down the Via Appia some moons ago shouting dire prophecies. Trying perhaps to start a new cult. To those who would follow him he promised chariots that would move without horses, lamps that would burn without flame, and"—Bibulus bent double with laughter—"and galleys that would fly through the air like birds! Verily!"

Pete's eyes widened.

"Zeus! Go on!"

"He tried to make magic. He filled a pot with a liquid that burned like fire. He wound strands of wire around metal cylinders, and plunged a bit of copper into the pot. Then he began to shout and call for some metal whereof no one had heard—what was it? I forget. They brought him *zingiber*—ginger. He flung it down and trod upon it. He yelled loudly for—I have it!—*zinc!*"

Pete whistled.

"I see it all now," he muttered. Aker planned to build a series of simple galvanic batteries, and with them power his primitive electric motors made of coils and armature. But he had forgotten one vital thing; zinc, necessary for his battery, wasn't known until the sixteenth century! "So what happened to 'im?"

"No one knows. But I shall search further. And now you must hold court, Petus Manxus. Here—your toga. Many await."

UNCOMFORTABLY, Pete donned the garment, arose from his cushioned bench, and went into the next room. Once a dignified example of Roman architecture, it had been altered somewhat under Pete's orders. A railing kept the spectators at a distance, and to the left of the desk of the *magister* a railed-in enclosure held the prisoners.

There was a spattering of applause as Pete mounted the bench. He waved a negligent hand.

"First case," Bibulus called. Two guards marched forward, impelling between them a large, handsome young man with jet-black curls and a harassed expression.

"A poisoner," whispered Bibulus, as the defendant was hustled into the dock. "He tried to slay Gaius Hostilius, the consul."

"What's his racket?" inquired Pete in his abominable Latin.

"A street magician, of strange powers. He attracted the consul's attention with his tricks, and performed the miracle of turning water to wine. *That* was all right, but Hostilius demanded that the cup be brought to him. When he drank of it, he fell down and rolled about in agony."

Just then the prisoner, who had stared incredulously at Pete when the latter's ungrammatical Latin had soiled the judicial atmosphere, began to shout in a language incomprehensible to the others.

"Manx! Manx! Is that you, for heaven's sake?"

"He casts a spell on us!" cried Bibulus, and a guard promptly suppressed the unfortunate prisoner in no uncertain manner.

"Petus Manxus—by the gods! What ails you?"

"Zeus," gasped Pete, glaring at the defendant, "has stricken me with a thunderbolt!" Then, in English, "Hey, Prof! Is that you?"

"Manx!" squalled the young man. "Of course it's I! Get me out of this, quick! I didn't poison the fellow. My—er—plans went wrong and I was supporting myself with simple chemical magic, when he—"

"Sure. Sure." Pete soothed him. "I'll give it the fix." He turned to Bibulus. "We'll just dismiss the charge. It's his first offense."

"Poisoners," Bibulus frowned, "are always thrown to the lions."

Pete silenced him with a lifted hand, pronounced sentence. As he felt the people were behind him strongly, he was naturally greatly surprised by the outburst which greeted his announcement that the prisoner would go free.

Rome didn't like poisoners.

"To the lions!" someone bellowed. "Flay him alive! Tear out his tongue!"

The professor seemed to shrink. Pete looked about in desperation. He met the eyes of a veiled woman who sat in a corner—watching him intently—perhaps the same one Bibulus mentioned. No help there. But there was a florid, benevolent-looking old man in the front row, and to him Pete turned for aid.

"Sir, will you use your influence in quieting this mob? After all, I'm sure the prisoner had no murderous intentions, and maybe the consul deserved killing anyway, if what I've heard about Gaius Hostilius is true."

Bibulus clutched Pete's shoulder.

"Gods, Petus! You put your foot into it that time. That's the plaintiff, Gaius Hostilius!"

It looked like a big day. The crowd suddenly turned into a mob, with the volatility of the Latin temperament. Pete caught a glimpse of the veiled woman vanishing through a curtain, and saw Gaius Hostilius mounting a chair to shout, "Down with the tyrant! Is this Roman justice?"

"*No!*" roared the mob. "To the lions with both of them!"

"My-y-y friends," began Pete, then decided the moment unpropitious for a speech. Instead, he grabbed the professor's arm and dragged him back through a curtained aperture. But the mob wasn't so easily thwarted. They came bellowing in, and Pete and Professor Aker fled for their lives. But in vain. They were finally cornered in Pete's private bath, and attacked with fury.

"Bibulus!" Pete roared. "Get help!"

But Bibulus had long since decided on the better part of valor; he had discreetly vanished.

The tumult and the shouting died as a corps of guardsmen marched through the mob, swords bared. Under threat of bloodshed the crowd subsided, drawing back to wait watchfully.

"You're just in time," Pete sighed thankfully to the bronzed *legatus*. "Brother, we needed help, and how!"

"Seize them," the lieutenant snapped. "Disarm those men! Petus Manxus, you and this felon are under arrest. Caesar himself will decide your fate this day!"

CLAUDIUS DRUSUS GERMANICUS, Caesar Imperator, gnawed on a mutton bone in one hand; with the other, he wrestled impotently with an ornate *clavus pila* board, tilting it this way and that as a marble bounced merrily down its length. He was a stunted, unhealthy, red-eyed person, clad in plain white garments, his fingers hidden beneath a blaze of jeweled rings. Claudius looked up as Pete and Aker entered.

"Ah," said Caesar pleasantly, shooting another marble, dropping the table, and reaching for a goblet. "Malefactors. When are the next games, Cratinus?"

"They are in progress now," Cratinus said. "These men are here at the order of the Empress Messalina, Caesar. She was in the fat one's court—he's a magistrate—when the riot broke out, and she summoned the Imperial Guards."

Just then a strikingly lovely brunette came through a curtained doorway.

"Here is Messalina now," Claudius beamed. "Sit beside me, my dear. We have these dogs you ordered brought before us."

The Empress sank down, her dark eyes scrutinizing the men. "And what do you intend, Claudius?"

"Feed them to the lions." Caesar solved the problem with a gesture.

Messalina frowned, but said nothing. Claudius pondered for a time, and suddenly laughed.

"One moment! I've an idea—one that should amuse us, since this banquet is so dull. If either of these two men can prove he deserves to live, he *shall* live and be honored. If he fails—there will be a holiday in the arena tomorrow."

The guests applauded. Caesar motioned the guards back.

"Now, you two. Show me your worth! You first, young man. What is your profession?"

Professor Aker gulped. "I am a scientist."

"What? A magician, more likely. Well, do magic for us."

The unhappy professor stared around desperately.

"I—I have no equipment—"

Cratinus whispered in the Emperor's ear, and Caesar looked up with a gleam

in his eye.

"I hear you can turn water to wine. Do so!"

"I can't," Aker confessed. "Not without certain—necessities."

"A faker," Caesar said. "As I thought. To the arena with him."

"Wait!" Aker struggled to free himself. "I—I can foretell the future. I'm a prophet, that's it! I can tell the future of Rome."

Claudius was interested. "Well?"

"Er—Rome shall rule the world."

"Rome *does* rule the world," Cratinus pointed out. "Every *puer* knows that."

The professor tried again.

"Two thousand years hence science will rule the world. Horses will be almost extinct. Electricity—a certain invisible force of nature—will provide unlimited power—"

"Our poets can do better than that," Caesar yawned. "And I like not what you say about horses. A noble animal, the horse. If these be your best prophecies—hold!" Caesar leaned forward. "If you can truly read the future, tell me how I shall meet my death!"

Silence. The guests paused with food or drink half-lifted. All eyes were on the unhappy Professor Aker.

And he, after a hasty glance at Messalina, broke into a profuse sweat and closed his eyes, shuddering. For, as every schoolboy should know, Claudius Germanicus, Caesar Imperator, was poisoned by Agrippa, his wife, after he had put aside Messalina. And to go into detail about this, Aker realized, would not only be untactful but suicidal.

CAESAR grunted and turned to Petus Manxus.

"What about you? I hope you're of more worth than this idiot."

Pete took a deep breath. He said gravely, "I am worth a fortune, Caesar. Hidden in a secret place in my house is much gold. Too much for a private citizen to possess. Now if you would accept this treasure as a pledge of my loyalty . . ."

The Emperor's eyes gleamed. The greed of Claudius was notorious in Rome. Pete felt a little wave of relief.

"We shall see," Caesar said ambiguously. "Cratinus, do you go and examine this treasure. Where is it to be found, prisoner?"

Pete gave directions, and Cratinus hurried out. Then, at a wave of the Emperor's hand, Pete and Aker were seized by the guards and pulled back against the wall, where they waited while the banquet proceeded.

The minutes dragged. Yet it was not long before Cratinus returned. With a baleful glance at Pete he approached Caesar and began whispering hurriedly into the Emperor's ear. Claudius sat erect with a jerk. He turned to glare at the prisoners.

"It is not wise to attempt trickery upon Caesar," he said at last, in a dangerously low voice. "Cratinus, speak out. Let us all hear of this deception."

Nothing loath, Cratinus announced, "I found the treasure chest where Petus Manxus said it was, filled to the brim with spherical golden ingots. Apparently there was a fortune before me. But I have dealt with thieves before, and I tested one of the ingots. It was of pottery—baked clay—with a shell of gold about it to conceal the deception. All were alike. Almost worthless!"

Caesar's face was bleak and cold. "Take those men away. Tomorrow we shall watch the lions feed."

PETE spent an unhappy night in the dungeon beneath the Colosseum. He was, he admitted, in a tight spot. And there seemed no possible means of escaping Caesar's vengeance. Pete tossed for hours upon his straw pallet, but arrived at no solution to the problem. Certainly Professor Aker couldn't help; he had been dragged off, shouting, to some other dungeon.

At last a guard opened the door. He seized Pete's arm, and, with the point of a short-sword, urged his unwilling prisoner along a corridor, through a metal grating that swung back on creaking hinges, and into the arena.

Blinding sunlight blazed up from yellow sand, with which the floor of the Colosseum was carpeted. From the spectators—an avid multitude of them, blood-hungry, impatient—came a thunderous bellow. They had been waiting

for hours, some of them, and this was the first event of the day's games.

Petus was urged toward a box above which a purple canopy hung. He looked up to meet the malevolent stare of Claudius, who sat surrounded by high nobles of the court, Messalina at his side. The Queen's face was immobile until she saw Petus; then she leaned toward Caesar and whispered something to the Emperor. Claudius nodded, smiling unpleasantly.

Just then the guards dragged up a shrinking figure. It was Professor Aker. His knees were wobbling and his eyes were bloodshot and wide.

Caesar leaned forward. His voice rang loud in the great Colosseum's arena.

"Petus Manxus, in a moment you and your companion will be alone with the lions. It is our custom to allow prisoners in the arena a short-sword with which to defend themselves, but Messalina has suggested a more interesting weapon. Both of you will be given torches—lighted torches to keep the lions at bay. As long as the torches burn, you will live, perhaps. If you are sufficiently skilful." Claudius' face was alight with malice and cruelty. "Now as to this gift of yours, Petus Manxus—these golden globes from your treasure chest. You have asked for them. You shall have them. So—" The Emperor waved his hand. Immediately guards hurried forward, each of them bearing two of the golden spheres. Before Pete could move he was seized and hurled to the ground.

Cords were tied tightly about his ankles. To the ropes a net was attached, and the guards swiftly filled it with the globes. There was a flurry of well-disciplined action; the soldiers marched away; and a door clanged. Pete struggled upright.

A convict with ball and chain! Pete's ankles were firmly attached to the net filled with the heavy globes. He took a step forward, stumbled, and fell flat on his face.

There was a rattling of metal. A low, distant growling grew louder. The murmurs of the audience grew to a bellowing shout.

"*Leonis*—the lions!"

PETE heard a strangled gasp. Through sand-blinded eyes he saw Aker staring, jaw agape, at the far end of the arena. In nerveless hands the professor held two short torches.

Just then a bright object sailed glittering through the air and dropped at Pete's feet. It was a knife, thrown to him by Bibulus.

He snatched it up.

"Professor!" he yelled. "Hold on! Don't drop those torches!" Swiftly Pete bent, slashed the cords that bound his feet, and sprang to the netful of glittering globes.

But the lions were in the arena now, and they scented prey. A dozen of the tawny, lithe beasts came pouring up the runway, tails lashing, manes tossing in the sunlight. An angry roar came as a lean, dark-coated lioness shot forward like a thunderbolt, her tail erect.

Caesar leaned forward, moistening his lips with his tongue. Messalina sat motionless, her eyes fixed on the tableau beneath her.

But Pete was almost ready. A few slashes with the knife had parted the cords of the net, and the golden globes rolled free on the sands. Pete snatched up one and turned just as the lioness bunched her muscles a dozen feet from Aker and—sprang!

The paralyzed professor couldn't move a muscle. He stood waiting for the hungry carnivore to smash him down to the ground, his face paper-white, still gripping the flaming torches in fear-tightened fingers.

Pete seized the torches, thrust the professor aside with a hasty shove, and drove the burning brands out in a swift stabbing motion.

The lioness tried to turn in midair; she failed, and one of the torches ground into her muzzle. She screamed, snapped at the flames, and suddenly turned to race away, shaking her head in agony. She was out of the battle for a while, at least, Pete realized. But the other lions were coming—and coming fast.

Pete still held a golden sphere under his arm. He bent his head, gripped a bit of whitish string in his teeth, and pulled. A few more inches of string was drawn out. Pete lit it with the

torch, hefted the globe in his hand, and hurled it at the approaching lions.

The glittering sphere sailed through the air, fell under the nose of a carnivore, and rolled a few feet. The string was sputtering slightly, an almost invisible bluish flame rising from it. One of the lions batted at the thing with an angry paw—

And then hell broke loose in the Colosseum! With a thunderous, earth-shaking roar a holocaust of deafening, fiery madness blasted out, scattering fragments of bloody lion-meat upon the horrified spectators. Caesar fell back in his gilded seat. The remaining lions stared, aghast, and then fled.

Pete laughed in an unsteady voice.

"Hey, professor!" he called. "Grab some bombs for yourself!"

Aker scarcely seemed to hear. He swiveled to look at the pile of golden globes. His lips formed the word, "Gunpowder! Bombs!"

Caesar sprang up. "Open the gates!" he shouted. "Turn loose the beasts—all of them! Slay me these demons!"

Frightened guards leaped to obey. The clanging of metal sounded. From the distance came a heavy thumping and a confused sound of roaring, caterwauling, and trumpeting.

"Take a torch," Pete snapped, thrusting one of them in Aker's hands. "Here they come!" He considered hurling a bomb at Claudius, but the sudden advent of a score of leopards distracted his attention. He blew the great cats into bits with a well-placed overhand throw.

AKER had come to life and was doing his share as the runways disgorged beasts into the arena. Gasping, he threw a question at his companion.

"How—how did you make these?"

"Always knew how," Pete clipped, lighting a bomb. "Used to make fireworks in a medicine show. Sulphur, charcoal, and saltpeter. Burned willow for the charcoal. Got the sulphur from the volcano—what's its name—Vesuvius. Bribed a lieutenant to bring me saltpeter from Arabia. He didn't know what it was—but I'd seen the stuff in Chile and told him what to look for. Get that tiger!"

Aker hastily lit and threw another bomb. The tiger disintegrated. Pete kept on talking swiftly, jerkily.

"Always get ready for trouble—that's my motto. I figgered I'd get the jump on these Romans if anything went haywire. So I fooled around till I got the right mixture for gunpowder, and then loaded a lot of pots with it and put in shrapnel—all the scrap metal I could find."

Then came an elephant. It got uncomfortably close, but an exploding bomb disrupted the creature's nervous system and it went trumpeting and thundering around the arena, causing additional confusion and adding to the bedlam.

Pete clipped out, "An' I gilded the bombs just in case. Figured they'd look harmless then—just big round gold ingots. If I got in a tight spot, I could always offer to buy my way out, and when I got my hands on the bombs—well!"

Aker shouted, "Manx! Look!"

Pete whirled—and stood staring. Danger from the animals was past. The few that remained alive had fled, or were cowering against the walls of the arena. But directly under the royal box was the wounded elephant, trunk waving, tiny eyes blazing, trumpeting in rage. He was *must*—mad! The tumult in the box must have attracted his attention, and he was charging against the massive stonework wall with titanic, jolting blows, while above him men fought and screamed and sprang to escape.

Caesar himself, attempting to flee, stumbled against Messalina, and Pete had a confused idea that the Empress had hurled Claudius down and overturned the gilded throne upon the squirming Roman. That done, Messalina hurriedly left.

"Hold everything!" Pete called to Aker. "I got an idea."

The wall was already buckling; masonry cracked and groaned under the onslaught of the great elephant. Pete lit a bomb, gauged his distance carefully, and threw it. The resultant explosion made the elephant whirl, trumpeting, his piggish eyes searching the arena.

He saw Pete. He started forward.

Pete threw three bombs. If they failed, he was lost. He had but one left.

But the home-made gunpowder-and-shrapnel did the trick. The elephant died in a thunderous roar of tearing, blinding explosion.

A little silence fell upon the arena. The beasts were slain; the mob, realizing this, paused tentatively, ready to renew their flight. Pete gripped his last remaining bomb, stepped forward and waited for Claudius to crawl to his feet.

The Emperor of Rome was a wreck. He shot a horrified glance into the arena and started to run. A shout from Pete stopped him.

"Hold! Halt, Caesar!"

Claudius froze. He glared down, shuddering. Pete lifted the bomb menacingly.

"I have destroyed your beasts," he called, "and I can ruin Rome as easily."

Claudius gave a terrified squeak. Messalina suddenly appeared, hurried to the Emperor's side, and whispered to him. Caesar seemed to grasp new hope.

"Petus Manxus!" he called, his voice unsteady. "Do not use your magic! You are pardoned! More—I make you a consul of Imperial Rome—"

Swish!

PETE MANX opened dazed eyes, stared blankly at a face that seemed oddly familiar. For a second he thought the bomb had exploded after all. Then, quite suddenly, he recognized Dr. Mayhem. The Doc! And all around were the wires and gadgets of the Doc's laboratory. Rome had vanished—Caesar, Messalina, the Colosseum, and all the rest.

"Oh, my head," Pete moaned, rising unsteadily. "I feel like I been through a knothole. Lemme feel you, Doc, an' see if you're real."

Mayhem chuckled.

"It's real enough, Manx. You're back home unharmed, as I promised." He turned as a hoarse groan sounded. "Oh, here's Professor Aker. He woke a bit before you did."

Pete noticed the laboratory was deserted save for the three of them. Aker was leaning against a chair, swallowing convulsively.

"Let me out of here," he gasped. "Mayhem, I—I—" He turned a virulent green and staggered toward the door.

"Just a moment," Mayhem called. "Do I get that equipment?"

Aker hesitated.

"You gave your word," Mayhem reminded. "It was a bet. And in Rome you discovered how necessary the right equipment is. Besides, how would you like the students to learn of your—um—activities as a poisoner?"

"It's blackmail," Aker cried. He looked at Pete, grimaced, and threw up his hands. "All right. You get your equipment. I hope it chokes you, Mayhem."

The professor departed hastily, leaving Mayhem chuckling quietly behind him.

"Here's your hundred dollars, and a hundred extra for winning out. Thank you!"

Pete counted the money carefully, and then looked sideward at Dr. Mayhem.

"Uh—I was wondering about what you just said to the professor, Doc. How'd you know so much about what happened in Rome, anyway?"

Mayhem snickered. "I didn't tell Aker *all* the secrets of my time machine. It can be operated automatically. After I sent you two back into the past, I joined you, just to keep an eye on things. It took me six experimental trips before I arrived in the mind of someone of importance, where I could be sure I'd hear everything that went on in Rome."

Pete's eyes widened. "So you were there? But who—who were you? And anyhow," Pete chuckled reproachfully, "that wasn't exactly fair, when you come right down to it."

Dr. Mayhem's face cracked into a broad grin.

"You shouldn't say things like that, Pete; it might get you tossed to the lions! I was Messalina! And don't forget, Messalina was Caesar's wife. And Caesar's wife is above reproach!"

MORE THAN A TRILLION TO ONE!

FINGERPRINTS can be duplicated!

Experts claim that no two people in the world have identical fingerprints. However, it is possible that somewhere, sometime, the biological

pattern that makes each individual's prints different from all others may be repeated. The law of averages, you know.

So—it has been estimated that fingerprints may be duplicated once in 1,606,937,974,174,171,729,761,809,705,564,167,468,221,676,009,604,401,795,301,376 times.

A particular fingerprint will be repeated—in about 2800 years!

COSMIC MYSTERY

NOTHING known to science can explain the magnetism of our Earth!

Scientists are still searching for a hidden clue or perhaps a new and unknown principle of physics which can explain the large magnetism of the Earth and the far vaster magnetism of the sun!

For 10 years the Department of Terrestrial magnetism of Carnegie Institution of Washington, under the leadership of Dr. J. A. Fleming, has searched for the answer to the baffling question, the solution of which would make clearer the role played by the Earth's magnetic field in man's daily life—a role which affects radio, wire communication, cosmic ray intensity, and many other factors in man's existence.

The program which began and still seeks explanation of Earth and solar magnetism has led into the hearts of the tiniest things in the Universe. But nothing known to modern physics can give the faintest clue which might explain the permanent magnetism of the Earth!

SENSITIVITY PLUS

A GALVANOMETER that will detect a current variation of a ten-trillionth of an ampere, has been built by the Smithsonian Institution.

Twenty times more sensitive than any heretofore used, this instrument, together with a thermocouple, will make available to astronomers data from which can be deduced hitherto unobtainable information on the structure of luminous bodies in space.

WHEN CENTURIES MAKE A DAY

IT takes more than four thousand years to make a day!

It's this way. When Pope Gregory XIII reformed the calendar in 1582, with the advice of the astronomer, Christopher Clavius, he corrected an error that had existed in the earlier Julian calendar of nearly ten minutes a year. But his calendar was far from perfect!

The average length of the year according to the Gregorian calendar is about 24 seconds longer than it should

be—the time that the Earth takes for a complete trip in its orbit around the sun. But this remaining error is so small that it will not be until about the year 4600 that our calendar will be as much as a day in error.

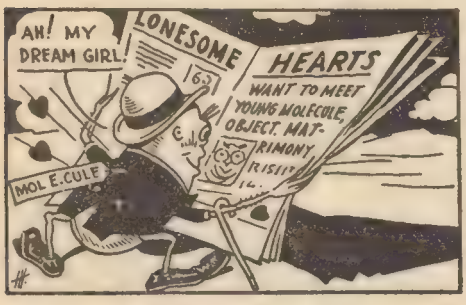
At present the difference that has accumulated since Pope Gregory's time is only about three hours.

MOLECULE MEETS MOLECULE

IT is impossible to produce a perfect vacuum!

However, the emptiest man-made space ever attained is now being created by the newest vacuum pumps which use oil molecules to sweep out the air from scientific apparatus.

While the perfect vacuum can never be achieved, science can now produce



a vacuum in which it is possible for a molecule to travel nearly 500 feet (15,000 centimeters) before it would encounter another molecule.

Since a molecule is only about .0000001 centimeter in diameter, it means that in traveling 15,000 centimeters the molecule goes over 100,000,000,000 times its own length before meeting a companion. Here, truly, is loneliness.

If the same emptiness were applied to people it would mean that a man 5.2 feet tall would have to travel over 100,000,000 miles before meeting anyone. The loneliness would be greater than if there was only one man on the Earth and another on the sun!

THE POLAR MONOPOLY

THE North and South Poles may be cold—but they receive 65 hours more sunlight a year than does the equator!

The explanation is that the Earth's atmosphere refracts the sun's rays so that the sun is visible even when it is below the horizon. At the equator this results in the increase of only 40 hours a year, compared with 105 hours at the poles.

The Eskimos don't have to go in for Daylight Savings.

THIS INCREDIBLE EARTH

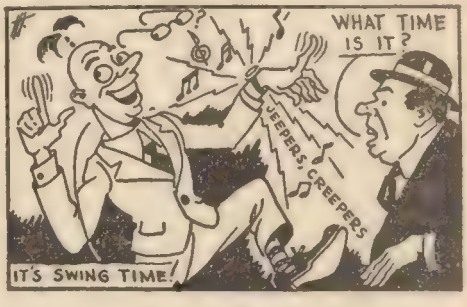
ZETA AURIGUE, the largest star in the eclipsing system, and which is equivalent to about 10 million of our suns, is as dense as the vacuum in an electric bulb. . . . Since the Earth's air weighs 11,850 million millions of pounds, all the heat produced in factories, homes, vehicles, etc., increases the temperature of our atmosphere only 1/54 of one degree. . . . The house meter in your cellar is built with the precision of a fine watch. The Meter Division of the Westinghouse Company uses 2,000,000 sapphire jewels annually in their meters.

THE WIZARD WATCH

SCIENCE has perfected a watch that needs never be wound!

You've heard of watches that depend on their energy to keep ticking by tapping the pulsebeats in the human hand? Well, engineers have gone one step further and invented a watch whose source of energy is invisible.

This newest timepiece is a delicate instrument constructed to absorb the free emanations of radio waves and



short waves in our atmosphere. The minute impulses activated by the transmission of radio waves are enough to keep this wonder watch going indefinitely — and accurately. Time marches on!

SECRET OF THE SUN

A Rare Treasure Was Locked in the Solar Spectrum—and Olaf Stevens Wanted to Steal It!

By RAY CUMMINGS

Author of "The Great Adventure," "Around the Universe," etc.

BIG OLAF STEVENS sat in a corner of the laboratory, his huge powerful hands dangling between his knees, and silently watched Dr. Argon. The little gray-haired scientist was crouched over his work-bench, the electronic sheen of prismatic light upon him.

It was late afternoon. The laboratory, here in Argon's lonely home in the hills of Northern New York, was dark with shrouded windows. The single door which led down into the living room was closed. A huge electro-spectroscope was hissing with the current in its prisms. It was trained on the ceiling where, through an aperture, a pencil-ray of sunlight came down—sunlight that was spread upon the spectroscope's big image-screen with a great band of lines that showed the burning elements in the gases of the sun.

The stolid, slow-witted Olaf Stevens only vaguely understood the purpose of the spectroscope. For a year he had been working with Dr. Argon—just the two of them alone here in the metal-concrete house on the hill-top by the edge of the woods. Master

His big fingers tightened on the scrawny throat

and servant. Stevens' thick, gnarled hands were twitching now as they dangled between his knees. This thing that Argon claimed to have discovered—this mysterious secret of the sun—would bring fame and riches. A secret that could be sold for a great fortune. Argon had told him so. Whatever it was the scientist had manufactured it was worth thousands of times more than its weight in gold. Of that, Stevens was certain.

A shadow from the chassis of the spectroscope illuminated by the fluorescent tubes behind it, fell upon Olaf's heavy, thick-featured face. He was glad of that. Old Argon would not see that he was waiting—as he had waited impatiently for so many days—for the experiment to be finished. It would be so easy to seize the little scientist by the throat, to spill that retort of molten metal upon him and tell the people over in town that Argon had killed himself in an accident resulting from some experiment.

"I've almost got it, Olaf." Argon's voice, quivering with eager excitement and triumph, mingled with the hiss of the small hydrogen torch with which he was working.

THE dimness of the laboratory was illumined at intervals by tiny puffs of light. They were queer little puffs. Each of them seemed no bigger than the head of a pin. Sheets of asbestos partly shrouded them. But the light of them puffed up to the ceiling. Queer little puffs indeed! Olaf seemed not only to see, but to feel them, each a tiny wave that seemed to strike at him like a blow.

He found himself covered with sweat. It rolled in torrents down his great hairy chest so that one of his hands fumbled at his throat as though he were stifling.

"I've got it, Olaf," Argon was murmuring. "You felt that last one? The secret of the sun! That was less than a hundredth of a grain, and it went to ninety-eight hundred. Why, I can run it into millions!"

Millions! Untold wealth! With only one million Olaf would have everything in life that he could want!

What was the secret of the sun? He wondered about it detachedly.

"Olaf! Hand me that insulator. Hurry!"

At the direct command, Stevens lumbered to his feet. He was trembling; bathed in hot sweat. But it wasn't fear that made his heart pound. Just excitement and eagerness. Now was the time!

"Insulator?" he mumbled. "Which is it?" Like a great gorilla he shambled forward, his arms dangling.

"That white cone over there." Argon gestured at a large white cone that stood on a table across the room.

"I'm going to try nearly half a grain and keep it wholly sheathed," he added. "Just the magna-thermite and the thermo-gauge inside the cone when the reaction takes place."

Stevens brought the cone. His fingers twitched as he gripped it—fingers that in a minute or two would grip little Dr. Argon's throat—squeezing—strangling.

But what was this secret of the sun? He must be sure that he would know how to complete the experiment. Not with just tiny fractions of grains; but with the whole mass of intricate chemicals which Argon had prepared. And maybe, even, Olaf would be able to prepare still more. The retorts with their mixing mechanisms were there on the bench.

Argon had been connecting the big cone to his apparatus at the center of the table. The cone was raised a foot or two, clamped into a lowering mechanism over the strange-looking little slablike tray, where infinitesimal fragments of the chemicals lay mixed, ready for the tiny ignition which would unite them.

"Dr. Argon," Olaf said suddenly, "I do not understand all this. What are your chemicals? How does it work? What is this secret of the sun?"

Argon paused to wrinkle up his thin seamed face. He grinned.

"My secret, Olaf," he said. "Mine—and the sun's. But when I demonstrate—I can get it up to a full grain at least, with the apparatus I have here—when I demonstrate my results to the world of science, no longer will anyone say that old Argon is mad!"

Was Dr. Argon mad? Doubt assailed

the big stolid Olaf so that for several moments he almost felt that he might lose this treasure which now was almost within his grasp. People said that Argon was demented, what with his vague talk of the secret of the sun, and his eccentric hermitlike habits. Dr. Argon should have had a skilled, trained assistant. But he had chosen Olaf. And Stevens knew why. Because Dr. Argon was not demented, but in reality a canny businessman. He would not trust any assistant with this treasure.

"It looks very wonderful," Olaf said quietly. "How does it work? With that little switch?"

DR. ARGON now had started the mechanism which would lower the big insulating cone. He shut off the tiny ray of sunlight and trained the big spectroscope on the table.

"I'll take a spectrograph of this," he said. "We'll be sure now that the spectrum band is the same as from sunlight."

The pencil-ray of sunlight now gone, the laboratory became a little darker. The retorts where Argon was preparing more of his chemicals gave off a lurid green sheen. Olaf's broad nostrils were dilating with the chemical smells. The whole place was so weird it had always given him a vague uneasiness. He felt that now, more than ever; and the hot sweat poured down on him.

Dr. Argon glanced at him, laughed.

"Good Lord, big fellow, you look frightened to death. This isn't a monster that's going to jump at you." Argon's laugh died to a grim chuckle. "Well, as a matter of fact, that's just about what it is," he added. "But this is a little monster—the cone will hold it. Watch now."

"But what are you doing?" Stevens urged. "Those chemicals—"

"You won't understand me," Argon said.

"But I'll try, sir."

The old chemist grinned.

"All right. I started with aluminum, which I brought into contact and united by ignition with an oxide of a chemically weaker metal. With an ordinary oxide, and just plain aluminum, I would get what is known as thermite. The aluminum combines with the oxygen of the oxide. But my reaction goes further, into what I might call magna-thermite of infinite yielding capacity. I am using an aluminum alloy of my own preparation, and an unusual oxide alloy. I discovered both their gases on the sun. You can see them in the spectroscope band—if you're clever enough to identify what you're seeing."

He pointed to his micro-scales. Stevens saw small piles of finely powdered chemicals, one gleaming white, the other a dirty gray.

"My mechanism ignites the mixture," he added. "That's simple. I guess you can understand that all right." He indicated his little apparatus under the poised cone. "That cone automatically drops a second before the ignition."

"I understand," Stevens murmured.

Dr. Argon nodded. He did not see Olaf's eyes gleaming; he did not notice Olaf's big twitching hands.

"The difficulty," Dr. Argon said, "has been to construct my apparatus to be impervious to the reaction. That table slab—that little tray—the very bulb of the thermostat itself—all of them have to be within the cone. It took me four years to devise the materials of which those things are made. Stand back, now—"

Olaf recoiled. His mind was trying to grasp it all. Two tiny fragments of chemicals. That little ignition timer and switch. The timer and the switch that would drop the cone. It was so simple. And now Olaf noticed exactly which of the little black buttons Dr. Argon was pressing, in the row on the mechanism panel.

"Now—ten seconds," the scientist murmured.

The cone lowered. Argon jumped up and shifted until he was standing with his back against Olaf, his head hardly above the servant's shoulders.

"Now—watch—"

BREATHLESSLY, Olaf watched. Under the big white cone there seemed a tiny puff. A little bigger than the others had been, perhaps. The cone did not stir. But something

invisible struck at Argon and Stevens —a great wave of something. Then it was gone; there was only a stifling, breathless feeling, with a clammy sweat trickling down Olaf's chest and legs.

"Good!" Dr. Argon exclaimed. "It was all right! Everything held." He darted toward the gauge of one of his big instruments, which had a tiny tube that connected with the cone.

"Over ten thousand!" Argon exclaimed. "That's with nearly half a grain of the oxide but only a hundredth grain of the other. Now I'm getting an idea of the proportions. That's all I'll try for at the present. The cone held it—but look what it did."

The big cone was no longer white. In places on the outside it was ragged and dirty gray-black — pitted and scarred.

"I took a spectrograph of that one," Argon said eagerly. "Just to prove that the lines are the same. Thermo-infinity. The sun's secret, and mine. Why, this will revolutionize the world! This will—"

He was hardly aware of Olaf springing at him, like a great snarling animal. And then he felt Olaf's big fingers on his throat.

"Why—" he gasped. "My God—" But his voice choked as Olaf squeezed tightly with a strangling grip. Argon's frail little body collapsed backward, so that he fell on his back with Stevens kneeling on him.

It was a chaos to the snarling Olaf, his big fingers tightening on the scrawny throat; his heavy knee pinning the squirming, struggling little body. The eerie light from the instruments showed Argon's face, with its popping eyes and open mouth. Then the body was only twitching; the eyes became glazed . . . Olaf relaxed. Dr. Argon's body lay still.

The thing was done! So easy. For a moment big Olaf Stevens crouched, panting with triumph; and then he lumbered to his feet. The huge retort of molten metal at the end of the work-bench was half full, its contents bubbling sluggishly. After Olaf had secured the treasure he would pour that liquid metal on Argon's face and throat. It would sear the flesh away like a blow-torch held to a tub of butter. There would be nothing left to show that the scientist had died of strangling. Anyone would say that a laboratory accident had killed him.

Olaf was trembling with eagerness as he poked around the intricate maze of Argon's apparatus. He was convinced that Argon had been creating a new substance. Some of it should be here—the result of those tiny puffs; the product of the chemical reaction which had taken place under the big white insulating cone.

Olaf's eyes brightened as once more he thought of the treasure. A substance new to Earth, of course it was worth many times its weight in gold. Olaf would gather it up and create more of it. He would hide it all; then take it back to his European homeland. He would wait a year or so, and then produce it and sell it. Riches for Olaf Stevens, at last.

But disappointment swept him. There was no trace here of any new substance. Was that because Argon's experiments had been on so small a scale? Of course! A hundredth of a grain, he had said. And that last big one—still not half a grain. Half a grain was nothing sizable to yield any treasure!

His disappointment was only momentary. Here under his eyes lay the two piles of powdered chemicals which Argon had so laboriously prepared. A gleaming white pile, and one which was dirty gray. Stevens knew how to unite them in larger quantities.

HIS big hands were shaking a little as he carefully mixed the two mounds of chemicals and put them on the slablike tray under the big cone. Soon the treasure would lie here.

The mechanism of the raised cone hummed steadily as he started the timer. Everything that Argon had done was clear in his mind. His fingers pressed the correct button of the timing-ignition.

Big Olaf Stevens stood back, watching eagerly as the cone smoothly descended. Ten seconds, Argon had said. Only ten seconds now, and he would possess the treasure. Thou-

sands and thousands of times more of it than Argon had ever created. . . .

Ten seconds can be an eternity of eager, tumbling thoughts. Olaf's mind went back to his boyhood home, the little village at the foot of the mountain with the great glacier in its ragged gash. And his thoughts flashed ahead to when he would be there again. People would say, "Olaf is a wonderful fellow. So clever—"

It may be that Stevens was aware that the ten seconds finished with a chaos under the white insulating cone—a flashing chaos that engulfed the cone and the table—engulfed the entire eerie laboratory. There was just a split second when Olaf's senses were able perhaps to record a prismatic glare in which the room—the house—everything—was melting into chaos. Then for Olaf Stevens there was only nothingness; and whatever of the unknown that comes to one who has entered Eternity. . . .

"THE house must have stood just about in the center," someone said. "Good Lord, it's hot here—let's get back."

In little awed groups, people were gathered at the edge of a great circular pit. Night had come. The yellow-red light of the molten earth and rocks, forty or fifty feet down in the pit, glowed eerily over the lonely hilltop and painted the rising smoke and gases with a lurid glare. Beyond the pit, the rocky ground was blackened; the edges of the encroaching woods down the hill showed naked, blackened tree-trunks.

In another group of men, at another point near the lip of the glaring molten abyss, a young scientist stood with several of the police and town officials.

"Yes, I knew him," the young scientist was saying. "Secretive old fellow. Always thought he was a little off—harping about some secret of the sun that he was after."

"But what do you think now?" one of the officials demanded.

The young scientist's grim smile faded.

"The most intense heat that we have ever created on Earth and measured," he said, "well perhaps it's something over four or five thousand degrees Fahrenheit, and the temperature at the surface of the sun is believed to be about sixteen thousand degrees. But that is infinitesimal compared to the sun's center, where undoubtedly there is a temperature of millions of degrees.

"How is that immense heat created and maintained? Well, that is the secret of the sun. A contraction of the mass upon itself, some say. But others think it is perhaps a form of radioactivity. Or perhaps the combining of chemical elements of a nature as yet unknown to us."

"And Argon discovered the nature of those elements? Or some new way of combining them?" somebody suggested.

The young scientist shrugged. "Perhaps he did. We have a hint of the process, in everyday commercial chemistry—the creation of thermite. The oxygen of an oxide is made to combine with aluminum. An enormous heat is generated by that reaction—heat that is commercially used for welding. I imagine Argon was working along those lines. He was always hinting at what he called magna-thermite. And talking about his goal being thermo-infinity."

GLARE from the molten rocks down in the pit painted the young scientist's face and showed that he was smiling.

"Argon wasn't trying to create any tangible substance like a treasure, as some people thought. He was generating heat. More and more intense heat, with thermo-infinity as his theoretical goal. There is a mathematical limit to coldness — absolute zero, where molecular vibration ceases. But there is no mathematical limit to rapidity of vibration—no limit, theoretically, to heat."

The young scientist was gazing with awe down at the molten glare.

"Argon must have created about a million degrees of concentrated heat here," he added. "A small concentration of the greatest heat that man has ever created on Earth!"

The secret of the sun. Olaf Stevens had demonstrated it perfectly!

RACE AROUND the Moon
A COMPLETE SCIENTIFICTION NOVEL
By OTIS ADELBERT KLINE

Rita Gordon

Undreamed marvels await the first space farers to visit the nether side of earth's vast and eternal satellite!

CHAPTER I

The Race

JERRY LEE'S gaze traveled appraisingly from one sleek, stream-lined rocket ship to another, then back to his own small ship. His was the gaze of an expert. Fifteen of his thirty years had been spent in tinkering with atomic motors, and rocket ships, and he had a right to feel that he knew something about them.

Turning with furrowed brow to "Speed" Eckers, his diminutive, bantam-weight co-pilot, he said:

"We're up against some pretty fast ships, Speed."

Eckers grinned up at his tall, red-headed superior.

"Skipper, when the *Streak* breaks through the stratosphere she'll make those scows look as if they're anchored."

"You're optimistic, I'm dubious," Lee replied. "The *Comet*, for instance, is quite a ship."

"A hippo in a mud hole."

"Wishful thinking, Speed. Morg Kendall, with enough money to buy and rebuild a stratosphere battle cruiser, would certainly not neglect to employ the best engineers to give her speed. He may be behind the moon before we're halfway there."

"If he ever gets off the ground at all," Eckers grunted. "The *Arrow*, that boat of Rita Gordon's, looks a lot more dangerous to me, even if it is smaller. Rich men's brats, both of them—Rita Gorden and Morgan Kendall. Spoiled. Pampered. Why did they have to get into this contest, anyway? They don't need the money."

Clang!

"There goes the bell, Speed. We'd better go in."

The contestants filed into the crowded central auditorium. Before a radiovisiphone stood Dr. Otto Bovardius of Vienna, white-haired presiding judge of the Associated Scientific Societies which were sponsoring the rocket-race.

As soon as they were seated the white haired Dr. Bovardius began:

"We are assembled here for what is to scientists and laymen alike a momentous event. It is a contest, yes; but it is more than that—it is an attempt at a beginning of man's conquest of the airless void of outer space. Yet more—such conquest is only a means to an end—the solving at last of the riddle of Earth's satellite. Yet more—the sequential exploration of the *other* members of the sun's family of planets, planetoids, and their various broods of satellites.

"Many theories have been advanced to account for the origin of our moon; not one has yet been proven. The latest theory, advanced by my friend and colleague, Professor O'Brien of Dublin, is one which has not yet been announced to the world. It would not be announced today, save for one thing—that is, that we hope to be able to prove it or disprove it through the efforts of these intrepid adventurers—these brave pioneers of space exploration—who are now seated before me.

"Professor O'Brien's belief is that the moon was once the nucleus of a comet which, entering the Solar System, was caught and imprisoned by the Earth. Gradually, he believes, the comet's lighter substances were dissipated by the sun. The nucleus, meanwhile, became solidified by gravity and enlarged by the collection of planetary matter and meteoroids which previously had been traveling undisturbed in their accustomed orbit.

The immense craters on the moon, according to Professor O'Brien, do not resemble those Earthly craters caused by volcanic action, but they do exactly resemble a crater in Canyon Diabolo, Arizona, which we know was caused by the impact of a large meteoric mass.

"Time does not permit me to go further

into this interesting theory at this time, nor into the many other fascinating speculations regarding the moon. For instance, the possibility that it supports life of some sort, the reason that its axial rotation, although it is much smaller than the Earth, is only about one thirtieth as fast, causing it always to present the same face to us, and thereby making us immensely curious as to what is on the other side—the side which no man of Earth has ever seen.

"The purpose of this scientific expedition—for such this contest really is—is first to determine the cause of the immense lunar craters, and second, to photograph that part of the moon which no human eye has seen! The first rocket ship to return with this data and these photographs will be adjudged the winner, and her commander will be awarded the million dollar prize offered by the Associated Scientific Societies of the World.

"And now, my brave adventurers, pioneers of space exploration, I am sure it is unnecessary for me to impress upon you the tremendous scientific importance of your quest. You are more than adventurers—more than contestants engaged in a race—you are scientists in search of facts.

"I wish each and every one of you a safe and swift journey—and may the best ship and the best navigator win. Return, now, to your ships. You will draw lots for your starting time, as each ship will start alone. The difference in starting time will be taken into account when the race is ended and the prize is awarded. Good luck!"

The contestants went out, got into their cars and drove quickly back toward their ships. Lee and Eckers, much to their disgust, had drawn the last-place slip.

"I don't care where the moon came from or if it's made of green cheese," Eckers said. "I want to get there first."

Neither of the two noticed the car in front of them, which stopped short before a rocket ramp. Lee plunged his finger to the brake button too late. They struck into the rear end of the vehicle with a jarring impact.

A tall, blond youth, leaning out of the car and saying good-bye to a diminutive, black haired, brown-eyed girl in a silk jersey and jodhpurs which set off every seductive curve of her slender figure, was flung from the car. Instinctively, he clung to the hand of the girl and, describing a none-too-graceful arc over her head, landed on his back, dragging her to the ground with him.

Jerry Lee

Morg Kendall

"Morg Kendall and Rita Gordon!" exclaimed Eckers.

But he found that he was talking to himself. Lee had already sprung out of the car to the assistance of the fallen couple.

Solicitously he bent over the girl, picked her up.

"I hope you're not—"

"Put me down, you clumsy oaf! Why couldn't you look where you were going?"

Startled, Lee quickly deposited her on her feet.

Kendall had sprung up, and was brushing the dust from his natty white wool flying suit.

"I can't say I appreciate your idea of a joke, Lee," he snapped. "But if you want to play—"

Suddenly his ham-like fist shot out in a swift uppercut that caught Lee beneath the chin, lifted him off his feet, and laid him on his back in the dust. A voice from the aerial speakers suddenly boomed overhead.

"Every navigator in his place in five minutes! The first ship will leave in five minutes. Any man not in his place will be disqualified."

"We'll finish this later," Kendall said, glaring at Lee, who was dusting himself off.

"Let's forget it," Lee grinned. "The score is even—a fall apiece. And although mine wasn't intentional—"

Kendall turned on his heel, sprang into his car and whirled away.

"Terribly sorry," Lee said to Rita Gordon. "If there is anything—"

"Don't mention it," she answered curtly. She turned and ran up the ramp toward her rocket ship.

"Come on, skipper," called Eckers. "Hurry, or we'll be disqualified."

"Coming, Speed." Lee sprang in behind the wheel, and they hurtled away to the *Streak*. They were in their places two minutes before the signal sounded. They sat tensely. Two minutes later the first rocket ship roared off into space.

CHAPTER II

The Stowaway

"THE *Shooting Star*," said Lee. "Traveling fast."

"The *Streak* will pass her before she's out an hour," Eckers said confidently.

The next ship to go, the *Galileo*, was off with the starter's signal, but something happened—no one knew exactly what—when she was less than a mile from the ground. She turned suddenly end over end, and shot straight toward the earth. It was all over—tragically over—in a few seconds. Driven at terrific speed, the huge projectile with its human cargo plunged its full length into the ground. There was an explosion. Dust and debris mushroomed up.

White-faced, the other contestants sat waiting. They knew there would be no postponement of the contest. One ship was already under way.

"The *Comet* is next," bawled the announcer. "The *Comet* will prepare to take off."

"Why couldn't it have been Kendall?" Eckers muttered.

Kendall got the *Comet* off with such terrific initial velocity that she vanished in half the time it had taken the *Shooting Star* to disappear, despite her immense bulk.

"There's our competition, Speed," Lee said quietly.

"The *Arrow* will take off next," called the announcer.

"She sure has nice lines," Eckers said.

"Are you referring to the ship or the pilot?"

"Make it both—there she goes—"

But the *Arrow* did not rise. Blasts from her propulsion tubes kicked up dust all around the craft, but she did not even move toward the top of the skids.

"That deals out another competitor, anyway," said Eckers.

The blasts from the *Arrow's* tubes ceased. Lee saw a slender figure run down the ramp and spring into a car. The car sped toward the *Streak*.

"Now what the—" began Lee.

"The *Streak* is next," called the announcer. "Stand by to take off, *Streak*."

"Every man to his post," shouted Lee, through his communication mike, as he strapped himself into his hydraulic seat before the control board. "Close the starboard airlock, Speed."

"Aye, aye, skipper."

Eckers plunged out of the control room, and ran along the narrow passageway which led to the starboard door. He pressed the button of the small atomotor which would close the circular outer door and screw it into the threads in the thick insulated hull. But before it could swing inward a small figure popped through.

"Hey!" he gasped, recognizing Rita Gordon. "We're taking off."

"My motors went haywire," she said, "but I'm not going to be left behind. I'll go along with you."

"Over my dead body!" said Eckers. "Get out."

He attempted to push her through the gradually closing door, but she laid a hand on his arm, and he felt a sudden numbness go through him, paralyzing his muscles, rendering him unable to move! Too late he saw the small contact pad held against her palm by a ring and connected to wires which ran up her sleeve. As the big door swung itself to and screwed itself into place, he sank to the floor, consciousness leaving him.

Swiftly the girl exchanged her immaculate white coat and shock helmet for his greasy ones. A moment more, and the ship must take off. She must be in the co-pilot's seat before this took place or the shock would crush her. Pressing the button which closed the inner door of the airlock she rushed into the control room, sprang into the co-pilot's seat, and strapped herself in.

"What took you so long, Speed?" asked Lee, too busy checking his gauges to look up.

She was about to attempt an imitation of Eckers' voice when the starting signal made it unnecessary. Lee opened the throttle of his six powerful rear atomotors.

The interior of the *Streak* was perfectly insulated against both temperature changes and sound from the outside, and so they did not hear the roar of the tubes. But the swift change from the daylight which filtered through the cabin windows because of the atmospheric diffusion of sunlight, to velvety star-gemmed blackness, told them they were already beyond the stratosphere and in the airless space between Earth and moon!

Lee's problem, as it was the problem of all the racers, was so to point and time the acceleration of his ship as to meet the moon in space. The orbital speed of the Earth, plus the speed of its axial rotation, imparted to the *Streak* a velocity relative to the sun of nearly 32,000 miles per hour. And since he knew the speed and rate of acceleration of the moon, the unknown quantity now entering his calculations was the rate of acceleration imparted to the craft by the rocket tubes.

Expressed more simply, his problem, assuming that he could remain in the plane of the ecliptic, resembled somewhat that of a man on an open plain in an automobile, attempting to overtake a tremendously swift express train traveling on a track that curved around his position and greatly increased its speed with each second of motion.

It involved intricate calculations, and the setting of numerous controls, but presently, when he had everything arranged to his satisfaction, Lee looked up at his companion.

"The little ship is sure traveling, Speed," he began, then stared in amazement at the dimpled face, with its big brown eyes fringed by curled lashes looking out at him from Eckers' shock helmet.

"Rita Gorden!" he exclaimed. "What in blazes are you doing here, and where the

deuce is Speed?"

"Couldn't stand it to be left behind," she said, "so I decided to come with you. Speed is all right—sleeping in his bunk. He'll come around all right."

"Speed sleeping? Speed wouldn't be sleeping at a time like this!"

She opened her palm, revealing the small electrode it contained. "Speed got violent, and I had to protect myself. I carry this little gadget for that purpose."

"Everything that went aboard this ship," Lee said harshly, "was weighed. We cut the weight down to the last gram possible in order to win this race. You knew that. Yet—"

"I only weigh ninety-six pounds, clothes and all," she replied. "Besides you just said the little ship was a traveler."

"It would be traveling faster without your ninety-six pounds."

Eckers' voice sounded behind them. "Right! Better shove her out the airlock. Give me back my coat and helmet!"

"Take them, grease and all, and give me back mine!"

"Now what, skipper?" asked Eckers, when they had exchanged coats and helmets.

"I'm a trained pilot," Rita Gordon said. "Let me take my turn at the controls. We'll handle it in three shifts."

"You haven't been trained to handle *this* ship," Lee replied. "What else can you do? Your status is that of a stowaway—not an officer."

"Thanks for reminding me," she replied icily. "I'll be glad to take any position, in order to work my passage."

"Can you cook?"

"No."

"You'll learn. Take her to the gallery, Speed, and tell Mike to put her to work."

"Okay, skipper," replied Eckers. "Come on, Useless."

Brown eyes blazing, Rita followed him along the handrail.

CHAPTER III

Rescue in Space

ECKERS came back and took his seat beside Lee. Lee suddenly stiffened. "Do you see what I see?" he snapped.

"What?"

"Two moving lights ahead. Looks as if they're circling each other."

Lee switched on the forward searchlight and reached for his binoculars. He focused them swiftly, then gasped in amazement. The lights were shining from the front and rear cabins of a long slim rocket-ship which was slowly turning end over end around its own center of gravity.

"It's the *Shooting Star*— disabled!" he cried. He put down his binoculars, and shouted into the control mike. "Safety belts, everybody. We're going to decelerate. Report when ready, and make it snappy."

Lee switched off the rear atomotors and turned on those in front. Hydraulic seats were flung forward as if the *Streak* had suddenly plunged into a huge net. They hurtled past the *Shooting Star*.

"Good lord, skipper! You're not going to lose the race on account of that outfit, are you?"

"There are thirty people aboard the *Shooting Star!* They are idling in space. Want to leave them there to die?"

If we try to help them we may get disabled ourselves. Then we'll all die."

"That's a gamble we'll have to take," Lee snapped.

He cut the forward rocket tubes on the left, causing the *Streak* to turn to the right and circle. They sighted the *Shooting Star* once more, turning over and over like a huge propeller blade idling.

Lee set his radiovisiphone for the *Shooting Star's* wave-length.

"*Streak* calling *Shooting Star*—*Streak* calling *Shooting Star* . . ."

The worried face of the *Shooting Star* pilot, Frank Lawler, appeared in the disc.

"*Shooting Star* answering *Streak*. Hello, Lee. We're in a spot. Good of you to stop, but go on and win your race. You can't help us."

"What happened?"

"Something that wasn't on the schedule. Kendall passed us a while back. His initial velocity must have been terrific. But the *Comet* is a heavy ship; he couldn't accelerate as rapidly as we could, so in quick time we were right up on his tail. The scoundrel dropped a space mine. I saw it coming and tried to dodge, but it crippled us. Most of our propulsion tubes are smashed in, and we can't get enough pressure through them to stop this somersaulting caused by the explosion."

The enormity of Kendall's crime took away Lee's power of speech.

He nosed in close to the *Shooting Star* and turned on a rocket blast against the direction of her rotation, at the same time holding the *Streak* in position with his rear atomotors. Gradually, the rotation of the *Shooting Star* slowed down—then ceased altogether.

"Now what are you going to do?" A voice said behind Lee.

Lee turned, and saw Rita standing in the doorway, gripping the handrail.

"Get back out of the way," he snapped. "Take the controls, Speed, and hold her beside the *Shooting Star*. Instruct Randall, O'Hara, Anderson, and McPherson to break out space suits, get into them, and come forward at once."

Once more he addressed Lawler in the radiovisiphone.

"We can't tow you behind on account of the rocket blasts, so we'll make you fast beside us and try to get you to the moon, where you can land and make repairs."

He gave Lawler no time to voice his thanks. Squeezing past Rita he hurried to his cabin where he swiftly donned his space suit.

As he stepped out into the hall once more, four men, similarly attired, came to meet him.

He switched on his headlight and the small radio beneath it. The men followed his example.

"We're going to make the *Shooting Star*

fast beside us," he said. "We'll use the mooring cables. I'll go through the airlock first."

He pressed the button for the small atomotor. The inner door of the airlock swung open. He went through. The door swung shut behind him. He pressed the button of the second atomotor, which opened the outer door. A moment more, and he stood in outer space on the starboard platform of the *Streak*—his first experience in the airless void of outer space.

It was breath-taking. The stars stood out like blazing jewels in exquisite shades of green, blue, yellow and red. Far over to his left, Jupiter swept its majestic way across the heavens, accompanied by its bevy of satellites, four of them easily visible to Lee in the clear airless void. At his left the sun blazed against the black sky.

Ahead of him was the moon, the goal of his ambition, now less than fifty thousand miles away. It was narrowing the distance, now, but soon it would pass them and widen the distance if they could not gain sufficient acceleration to head it off.

The hills, valleys, and immense craters of the illuminated side of the disc stood out so sharply, appeared so close with their contrast of blazing light and black shadow, that Lee felt almost as if he could reach out and touch them. The portion beyond the sunrise line was illuminated by Earthlight, which gave it a peculiar, ghostly appearance. Glancing back at the Earth, he saw it was in almost the same phase as the moon, save that its dark side, lighted by moonlight only, was larger and growing, while the dark area of the moon was smaller and shrinking.

Lawler, attired in a space suit, emerged from his own port airlock, to be followed a short time thereafter by a half dozen of his men.

Eckers skillfully held the *Streak* to her position beside the *Shooting Star*, and presently Lawler was able to catch the end of a cable which Lee tossed to him, making it fast to his rail. Another cable was made fast in the same manner, aft, and then the two ships were slowly drawn together.

Back in his cabin, Lee hurried out of his space suit. As he opened the cabin door he encountered Rita standing in the passageway. She held out a bottle of steaming coffee, and a plate topped by a huge sandwich.

"I thought you might want these after your labor outside," she said.

"Thanks," Lee replied. "Thoughtful of you, but I can't stop now. I'll be back in the galley, later, after I get the ship going."

It was necessary to adjust the push of his rocket tubes to equalize the drag of the *Shooting Star* on his starboard side. And then he found it necessary to replot his course, since he could not possibly regain his former rate of acceleration, and much time had already been lost.

This done, he called Speed Eckers to take over, and went to the galley.

"Speed ate your sandwich, but I'll fix you a fresh one in a jiffy," Rita said.

The coffee tasted good, and he hadn't known he was hungry until he got his teeth into the juicy, roast beef sandwich.

"Good coffee, Mike," he said, "and you, fair lady, can compose a mean sandwich. If you could only cook—"

"I'm beginning to get interested in the culinary art. Perhaps I'll try," she said.

They were interrupted by the voice of Eckers from the communication speaker.

"Can you come forward, skipper? Don't like to interrupt you, but there's a strange light ahead of us. I think it's the *Comet*."

"Coming pronto," Lee replied, springing up and hurrying to the control room.

CHAPTER IV

The Space Mine

LEE peered through his binoculars at the speck of light ahead of them.

"It is the *Comet*," he said.

He called Lawler and asked him to show no lights, then gave the order for "lights out" over his own intercommunication system. He turned off the radiovisiphone.

Swiftly they crept up on the *Comet*, which was limping along heavily, evidently having atomotor trouble. Lee managed the controls while Eckers watched the craft ahead through his night glasses.

Suddenly the latter exclaimed sharply:

"Look out, skipper! I think they just laid an egg!"

Lee shifted his rocket pressure, gunned his rear atomotors to the limit. A few moments later there was a terrific explosion marked by a bright flash, above and behind them. The space mine had exploded. Had they kept their former course and velocity it would have been a direct hit.

"Kendall's a cold-blooded devil," Eckers said bitterly. "Is he trying to murder us all just to win a race?"

"They called his father the 'Wolf of Wall Street'," Lee said grimly.

A searchlight flashed out from the stern of the *Comet*, apparently for the purpose of observing the effect of the explosion on the target. The light revealed nothing but a few tiny fragments of the mine. Other lights were quickly turned on, sweeping the airless void in all directions—that is, all but one: straight down. And the *Streak* was by now directly beneath the *Comet*.

Presently all lights winked out, indicating that Kendall either believed his mine had completely destroyed the two ships, or that they had set off on another course.

Lee shot forward once more. It was not difficult for him to outdistance the limping *Comet*, the rocket blasts of which appeared to grow weaker and weaker as it moved forward.

"What do you suppose has gone wrong with Kendall's atomotors, skipper?" Eckers asked.

"Looks as if he's cutting down on his fuel," Lee replied. "Afraid he might not have enough to get back to Earth. As for us, we'll have to begin to hunt for a nice soft spot to land on."

"How about the crater of Plato?" asked Eckers. "It's certainly big enough so we can't miss it. And most of the crater floor looks pretty smooth."

"I was thinking of it," Lee said.

Despite the deceleration blasts from the forward tubes, they were still hurtling forward at a tremendous speed. Sooner than Lee had expected, the ship was caught in the gravitational pull of the moon—their position was tantamount to that of a power-diving aviator above the earth. Lee leveled out, deciding that he had better circle the moon at least once before attempting to land.

Still decelerating, they shot across the immense ring of Plato so swiftly that its details were blurred. Then, almost before they were aware of it, they had reached the other side of the moon—the side which had never before been seen by a native of the Earth!

Both Lee and Eckers exclaimed in astonishment at the sight spread before them. First, it seemed as if a huge section of the moon had been sliced off or disintegrated. Then they realized that they were looking into an immense, bowl-like depression—that the moon was actually a huge bowl with its convex side always facing the Earth, its concave side always turned away. Three-fourths of the bowl was in shadow, but not a sharp, black shadow like those on the convex side. For the light which struck the farther rim was diffused like sunlight on the Earth. There was no sharp sunset line, but a gradually deepening twilight which was darkest on the side of the bowl nearest the sun.

Lee did not at once appreciate the tremendous significance of what he was seeing. When it struck him, he exclaimed in awe:

"Good lord! Here's something the scientists never dreamed of! A sunken world *with an atmosphere!* That diffused light proves it. And look at those clouds below us, floating in the air. Water vapor. It's raining down there! Can you beat it!"

They were over the center of the immense depression now, and Lee was delivering a running commentary on what he was seeing through his powerful binoculars.

"There's a sea down there, right in the middle of the bowl, with rivers flowing into it from all directions. And vegetation. Green jungle areas, marshes and plains. Vegetable life indicates the presence of animal life too. There's a big island in the center of the sea, and an immense *building* in the center of the island. A building. A building doesn't happen; it's built. Men inhabit, or have inhabited, this side of the moon. If not men, then creatures analogous to them."

He called his photographer on the communication mike.

"Are you getting all this, Bill?"

"Yes, sir. Four cameras clicking."

Eckers gave a sudden exclamation.

"Look, skipper! Did you notice those big volcanoes around the rim of the bowl. Or are they volcanoes? They're all the same size, spaced the same distance apart, and there are sixteen of them."

Lee turned his glasses on the nearest.

"Yes. They're not like the craters on the other side of the moon. They don't seem to have any bottoms. They're just black holes. Look like big tubes with the soil or rock banked up around them. More evidence of human intelligence, or something that parallels it.

"What do you suppose they are? Chimneys?"

"Hardly. Each is at least a hundred miles in diameter. We're going to find out."

The ship hurtled over the farther rim of the moon, and into the moon's shadow. Presently, far ahead of them, they sighted water of Copernicus, its tall rim catching the first rays of the rising sun. Beyond Copernicus other peaks and ring mountains glittered on the sunrise line. As they passed over the crater of Copernicus Eckers

Meet the Author of This Novel

Otis Adelbert Kline

OTIS ADELBERT KLINE, the author of RACE AROUND THE MOON, was born in Chicago, July 1, 1891. Mr. Kline has long been recognized as one of the most important science fiction writers in the country, and his famous interplanetary novels have been published in the most prominent national magazines. Many of his novels have been published in book form, and several of them have been produced by the movies.

Outstanding science fiction novels by Otis Adelbert Kline include: "The Planet of Peril," "The Prince of Peril," "Maza of the Moon," "Jan of the Jungle," and "Tam, Son of the Tiger."

He likes fishing, hunting, hiking, swimming and boating. He speaks Arabic fluently, and gets a kick out of preparing exotic culinary dishes, with his own special recipes, of course. Of his own writings, his favorite character is Grandon, of Terra, and one of these days we may hear more about this chap in a long novel for our companion magazine, STARTLING STORIES.

shouted:

"Look, skipper! There's the *Comet*. Right there near the western wall. They're preparing to fire on us!"

CHAPTER V

Attacked on the Moon

SWIFTLY Lee killed three forward atomotors, and they banked sharply to the right. He switched them on again as a shell burst over at their left.

He banked to the left, spiraled, and banked once more to the left, eluding three more shells from the cruiser before the eastern rim of Copernicus hid it from sight.

"Close call," he muttered.

Decelerating, they passed over Hipparchus. Beyond them the three ring mountains, Theophilis, Cyrillus and Catharina, joined together like Siamese triplets, hove into view.

"There's our spot," said Lee. "The cone in the center of Theophilus throws a good black shadow. We'll land there."

He spiraled downward. Soon they were circling the crater below the tops of its outer walls. Gradually, as they decelerated, Lee narrowed the circle. Twice they passed through the shadow of the central cone before he judged that it was safe to try a landing. They struck on their landing skids with the forward atomotors and levitor tubes gunned to the utmost—bounded in the air, and landed a thousand feet ahead. Then Lee let down his drag anchors and they came to a sliding stop in the exact center of the shadow.

"End of the line. All out," shouted Eckers, hurrying to get his space suit. "We've done it," he muttered to himself.

Lee hauled in his drag anchors, and hurried back to don his space suit. He found Rita Gordon struggling into one of Speed Eckers' suits.

"Isn't it thrilling?" she cried. "We're on the moon!"

"But not the first to land," Lee replied. "Morg Kendall beat us to it. I hope we'll be able to beat him back."

He dived into his cabin and quickly donned his space suit. Rita was ready to go through the air lock when he came out, so they went out together.

Captain Lawler and a score of his men were already outside, and helping Lee's crew to loosen the cables. They had come through with only slight damage—a twisted railing and a bent platform, due to the stress of the cables between the two ships.

Once more Lawler thanked Lee profusely for bringing them through. Together, they inspected his damaged rocket tubes, which he declared his mechanics would have as good as new within twenty-four hours. In the meantime, Lee's questing geologists returned with their hammers, picks, shovels and bags of samples, and went back through the airlock.

Lee ordered his crew back aboard the *Streak*. As Rita was not in sight, he decided that she must have already gone in. He had noticed her, a few minutes before, amusing herself by running and jumping. Because of the moon's slight gravity pull, she had been able to make some prodigious leaps, much to the amusement of the crew.

Because of the moon's lesser gravitational drag, Lee was able to take off in a fifth of the distance required on the Earth. He circled inside the crater twice to gain momentum, then shot up over the rim and away.

At five thousand feet, he leveled out, preparatory to rocketing back to the concave side of the moon which held so many fascinating mysteries. It was at this point that the *Streak* and the *Comet* simultaneously sighted each other.

Lee shot north, making a bee line for the Appenine Mountains. The *Comet* followed swiftly. Lee began zig-zagging.

The first shell burst close behind him, just as the *Streak* plunged in among the towering peaks of the Appenine Range. Here the smaller, lighter craft had a distinct advantage, since it was able to twist and turn much more quickly than the cruiser.

For some time, Lee followed the northwest curve of the Appenines, dodging in and out among the rugged peaks, and hurtling through narrow, tortuous canyons. Occasional shells burst behind them, but all were wide of the mark. Presently, on coming to an exceptionally large peak, he circled it, and turned back in the direction from which he had come.

The *Comet* was nowhere to be seen, so he judged that Kendall had done just what he had hoped he would do—plunged straight ahead on the assumption that Lee would continue his northwest flight.

He now turned straight north, hurtled across the Mare Imbrium between Timocharis and Archimedes, flew over the giant ring mountain, Plato, crossed the Mare Frigoris, passed over the north pole, and began his deceleration in the stratosphere of the huge lunar bowl.

With the *Streak* sufficiently decelerated to risk a plunge into the atmosphere, Lee circled downward.

"Have you decided where to land, skipper?" asked Eckers.

"First I want to investigate that island in the center of the sea, and the building on it."

They circled lower, plunged through a stratum of gray clouds, and found themselves above the sparkling waters of the central sea. Over to their right was the island Lee had noticed—circular in shape, and surrounded by a wall about two hundred feet high and twenty-five feet thick.

Inside this barrier was what apparently had once been a park or garden laid out in geometric designs. Now, however, it was a luxurious riot of tangled vegetation which overlapped ramps of the yellow opaque substance, traces of which could still be seen through the greenery.

In the center of the walled jungle stood a circular building fully a mile high and a half mile in diameter at the base, but tapering up to a diameter of about a quarter of a mile at the top. There was not a sign of a window or opening of any kind on its smooth sides. Eight small towers, however, were perched at equidistant points around the walled rim of the flat roof. And in each

of these was a circular opening facing outward.

"Doesn't seem to be any place to land here, except on the roof of that building," said Eckers.

"That's where we're landing, Speed."

A moment later the *Streak* skimmed over the edge of the rampart, missing it by inches, and came down on its skids. Despite the terrific blasts from the forward atomotors, it slid nearly to the opposite side of the roof before coming to a stop.

Lee called his chemist on the mike.

"Have you tested your air samples?" he asked.

"All tested," was the reply. "Same mixture as the Earth's atmosphere, but with a little more carbon dioxide."

"Enough to be dangerous?"

"No, I wouldn't consider it dangerous. Tried it on three guinea pigs with no ill effects."

"All right. I'll be the next guinea pig and try it without a space suit."

Lee was climbing down from his seat when the buzzer on his radiovisiphone suddenly signaled.

He switched it on, and to his amazement the face of Rita Gordon appeared in the disc!

"You!" exclaimed Lee. "Where are you? I thought you were in the galley with Mike."

"I'm in the control room of the *Shooting Star*," she replied. "I was underneath it when you took off. Morgan Kendall has just landed beside us—has his space guns trained on us. His men, armed with bomb guns, are swarming around the ship and have made all of Lawler's men outside prisoners. Lawler was captured with them. They're coming through the air lock now. I'll have to sign off."

The disc went blank.

"What are we going to do?" Eckers asked.

Lee's jaws hardened. "Kendall and Rita are engaged. He won't harm her. And he won't dare harm the others so long as he knows we're at large and can return to Earth to report. We're tending to our business for the present. First I'm going out the airlock to test the atmosphere. Tell Doc Waters to put on his space suit and keep an eye on me in case I keel over. Tell Bill O'Hara to get his camera ready. Then, if the air is all right, you and I and Bill will have a look around without our space suits. From the looks of this park or garden around us the place hasn't been inhabited for thousands of years—perhaps millions. So I don't think we need worry about hostile Lunites. However, we'll take a couple of bomb guns with us, just in case, and see if we can get into this building. For the present, tell the rest of the crew to remain in the *Streak* and turn her around to be ready to take off at a moment's notice."

Lee sniffed the air gingerly as he opened the outer door of the airlock. It was much like the air of any seaport city of Earth, but slightly more pungent. This, he judged, was due to the presence of the extra CO_2. He stepped outside—took a deep breath. The effect was actually exhilarating.

He signaled to the doctor, watching him from the control room. The doctor signaled Eckers. A moment later the latter emerged from the airlock, carrying two bomb guns and followed by the short, stocky O'Hara with his photographic equipment.

CHAPTER VI

The Lunites

LEE relieved Eckers of one of the bomb guns and led the way to the nearest tower. As they approached, he noticed a circular disc about eight feet high set in its base.

"A door maybe, but without knob or handle."

He stepped up close, and was about to touch it with his hand when, to his amazement it swung back, swiftly and silently, revealing a brightly lighted interior. Startled, he leaped back. No sooner had he done so than the door closed once more.

"Looks as if we're expected," commented Eckers.

"Electric eye," Lee said.

He stepped in close once more, and again the door swung open. This time he stepped through, followed by his two companions.

They were in a circular room about fifty feet in diameter. Its walls and floor were constructed from the same smooth, seamless material as the outer walls. But the entire ceiling was milk-white and luminous. There was no glare—just a gentle yet copious diffusion of light that permeated the entire room. An inclined ramp spiraled upward at one side. At the other, a second ramp led downward. There was a thin coating of fine gray dust over everything.

"If this place has been deserted for more than a thousand years the dust ought to be thicker than this," said Eckers.

"Right," Lee agreed. "Looks as if it had been cleaned not more than a month or two ago."

O'Hara photographed the room, and Lee led the way up the spiral ramp. This took them to another room in which a large, circular window faced the ocean. In front of the window a huge globe was mounted on a pedestal. Lee examined it. Although the globe itself was made from the yellow, opaque material used elsewhere, he noticed a transparent disc like a lens in the side facing him. Beside the disc a knobbed handle projected. On the other side a rod with a cross-piece at the end protruded.

Lee found that by moving the knobbed handle he could rotate the globe in any direction, like a ball-and-socket joint. Then he looked into the lens. At first he saw only a blur. But after giving the rod with the cross-piece a few turns, he exclaimed in surprise.

"What is it?" Eckers asked. "What do you see?"

"This is a telescope, and a mighty powerful one. I can see the edge of the bowl with the sun shining on it as plainly as if it were only a hundred feet away."

"Let's have a look."

Eckers, after adjusting the lenses to his own eyes, was equally amazed.

"We're in a lookout tower," Lee said. "From the eight towers around here the people who lived in this place were able to keep track of everything that went on in the bowl during the lunar day."

"During the night, too," said O'Hara, "judging from the looks of this gadget. If this isn't a searchlight lens on the other side of the globe, I miss my guess."

He pressed a small button, and instantly a powerful beam of white light shot out through the window.

"Shut that off!" Lee snapped.

O'Hara instantly turned it off. "Kendall?" he queried.

"Yes. If he spotted that flash, we'll have to get out of here fast."

"Well, why not?" asked Eckers. "We've got all the dope we need to win that prize. Why take any more chances?"

"We haven't scratched the surface yet. I'm going down the other ramp. You two go back to the ship."

"We're sticking with you, skipper. And if you're thinking of Rita Gordon, we're thinking of her too."

"Let's go, then."

There was a circular door at the other end of the room they had first entered. Lee walked up close to the door. It swung back noiselessly."

"Look out, skipper. This one might be a trap."

"If it is, it must have been set some time before the stone age," Lee replied. He stepped inside. Eckers and O'Hara followed him.

Suddenly the floor seemed to drop from beneath their feet.

"An elevator!" Eckers gasped.

"Right!"

Experimentally, Lee pulled down one of the levers near the top. Instantly, they braked to a smooth, silent stop—then started upward. Pushing this lever back into place, he pulled down the lowest lever. Once more they stopped, then started downward.

In less than half a minute, the lever automatically clicked back into place. The door opened.

The three stepped out, the door closed behind them. They found themselves in a runway about twenty feet wide, which evidently circled the entire base of the building.

"Basement," said Eckers. "Now where do we go?"

Opposite the elevator shaft, there were doors set at intervals of about a hundred feet around the hall. Lee made for the nearest, and it opened automatically, revealing another long narrow hallway, lighted like the rest of the building, and unfurnished. He stepped through, followed by his two companions.

Suddenly he halted, and swung his bomb gun forward.

"What's the matter, skipper? What do you see?" asked Eckers.

"Something moved—flashed out of that doorway on our right."

They advanced cautiously. The door in question was closed, but swung open on their approach. Lee peered through into a large, triangular room. It appeared to be an experimental laboratory. There were many odd-shaped flasks, tubes, retorts, as well as other paraphernalia and equipment new and strange to the Earthmen. And scattered about through the huge laboratory were a number of monstrous, eight-legged creatures as large as Shetland ponies.

The three men paused in the doorway.

"They look like spiders," Eckers whispered.

"Not spiders," Lee replied, eyeing the strange motionless creatures keenly, "but something evolved from the arachnida, the family to which spiders, as well as scorpions, ticks, and other similar cephalothoracic creatures belong."

"They look plenty dangerous to me," said O'Hara. "Let's get out of here."

"I don't think we need fear them," Lee replied drily. "Look at the dust that has settled over them. They've probably been dead for ages."

"But you saw something move in the doorway."

"Must have been my imagination. Come on."

He went in, prodded the nearest monster with his bomb gun. The thing had a hard, reddish-brown shell that gave off a hollow sound when tapped with the gun muzzle. Convinced beyond all doubt that it was dead, Lee moved closer to examine it. It was standing erect on four of its eight legs, before a tall table on which there was considerable paraphernalia. Two of the other four legs, which were armed with prehensible claws, were resting on the table, another held a large flask, and another a slender tube from which it had evidently been pouring a liquid, long since evaporated, into the flask, the bottom of which contained a thick, brown residue.

"I guess these are the Lunites, all right," said Lee. "The creatures that built this building. Most of those in this room look as if they had died on the job. They were super-insects—probably with immense brains. And they evolved from a class of creatures admirably adapted to accommodate large brains. With a cephalothorax instead of a separate head and thorax, the brain had unlimited space in which to expand."

"They may have been smart and civilized, but they give me the creeps," said Eckers. "Look at those eyes popping out of their heads on stalks. And their mouths—four sucker beaks with a pair of forceps to hold whatever they sucked in for food."

O'Hara, busily recording the scene with his camera, was photographing the sector behind them when he suddenly cried:

"Good Lord! Look! There *is* something alive in this room."

CHAPTER VII

The Fungus Death

LEE and Eckers wheeled simultaneously. Both men instinctively brought up their bomb guns at sight of the thing confronting them. This was not an arachnid, and did not resemble the dead creatures scattered around the laboratory save for the fact

Lee's appraising glance took in the scene

that it was walking on eight legs, which supported its huge, disc-shaped body. The new creature was about six feet in diameter and three feet thick. The legs and body were the same color as the walls of the building, and apparently armored with the same yellow material. Around the circumference of the disc, numerous retractile segmented tentacles writhed. At the ends of these tentacles were small funnel-shaped devices, hollow in the center and edged with flexible bristles. The tentacles were sweeping the walls, floor and ceiling, and Lee noticed that where it had passed all surfaces were free of dust.

"Don't go into a panic," snapped Lee. I don't believe this thing is alive. It's a machine—an automaton—an automatic janitor. See for yourselves. It's cleaning up the dust. That's the reason there's only a thin film of dust in the building. The rooms would be choked with dust otherwise."

"But how could it keep on functioning if the creatures that made it have been dead for millenniums?" asked O'Hara.

"Maybe there are some still alive," Lee said grimly.

He walked up to the thing, touched it with the muzzle of his rifle. It paid no attention to him at first. Presently one of the segmented tentacles brushed across his chest, evidently questing for dust—and finding none, passed on.

"Let's get out of here," said Eckers. "This place is getting me down."

"There are probably still more interesting sights," Lee replied. "Come on."

The next room they visited was smaller but contained at least a hundred arachnida, clustered in groups around six individuals placed on pedestals about three feet high.

Lee's appraising glance took in the scene.

"Dissecting room," he said. "See the cutting instruments, clamps and hooks. They've laid open the cephalothorax of the one on the pedestal. Probably they were trying to determine the cause of the disease that was wiping them out."

"The specimen they were dissecting is pretty thoroughly dehydrated, but it is easy to see they were checking the brain. Take a look. It has dried into a mass that doesn't fill a tenth of the original cavity. And there's also a small foreign body in it—shrunken and dried. Looks like a fungus of some sort."

"There's a diagram on the wall," said O'Hara. "Maybe that will tell what it is all about."

It told Lee plenty. An immobile arachnid had evidently met death while tracing the diagram. A small brush was still clutched in one claw, and there was a pot of dried pigment in another.

The three men gazed at the diagram for some time in silence.

"A strange story," said Lee. "Over here on the left is a diagram of the Solar System. Further away is a diagram of some alien star system with its planets and their satellites.

We have no way of telling what it is. But the line drawn from the two, with a half-sphere marked by various characters at intervals along its path, shows it traveling from that alien star system to the Solar System.

"This would seem to indicate that the moon was not originally a part of our system, but came in out of space in its present form."

"But what caused it to travel from one system to another?" asked O'Hara.

"That isn't revealed here. Obviously, however, these Lunites came with it. At any rate, it shows the moon entering the Solar System."

"But how could the Lunites live in interstellar space, without the heat of their sun or ours? Their atmosphere would be frozen solid. All life would be destroyed."

"I don't know about the latter. They could live in this building and others like it. Evidently it is air-conditioned, since the temperature and moisture content seem uniform everywhere. And it is at least ten degrees cooler here than outside. Also, the air is much drier. And of course they could bring in specimens of any plants or animals they wanted to retain."

"Suppose they did come from another system. That doesn't tell us what killed them."

Lee moved over to the right. His keen glance had already found the answer.

"Here we have a diagram that shows something about that. The moon approaches the Earth. As it draws near, a fine, intangible substance is seen emanating from our planet. Now, we have a diagram of the nervous system of a Lunite. Evidently that is what these individuals were checking when overtaken by death. This diagram shows tiny particles gaining entrance at the nerve ends and traveling toward the brain. It shows them growing in the brain. The obvious conclusion is that there is some fungus on the Earth, harmless to man, but possibly attacking certain types of arachnida. Its spores are so fine that they are wafted into the stratosphere and thrown off into space. So the vicinity of the Earth for hundreds of thousands of miles contains them. They are scattered, or sown by the Earth, as it spins along in its orbit around the sun.

"Perhaps the moon, at this time, was captured by the gravitational force of the Earth. The Lunites had plunged into a danger zone that spelled doom for them, but they didn't know it. Too late, they learned the nature of the menace. And apparently all died before they could escape or find a way to combat it. In fact, this one died recording it. These others died investigating. And possibly those in the laboratory were trying in vain to find a remedy."

"The history of the extermination of a race," said O'Hara.

"Maybe it's a good thing they were exterminated," said the practical Eckers. "They might have conquered the world—made slaves of men, or even bred them for food."

"Possible," Lee answered. "All arachnida are carnivorous. But we can't stop to speculate now. We'll have to finish our trip across this place and get back to the ship. If Kendall should discover the *Streak* it will be too bad for all of us."

The three men, passing row upon row of dead Lunites, walked to the central tower and entered.

Expecting to find a simple tower room with a ramp leading upward as they had at the top of the building, Lee was astounded at the sight that greeted his eyes. The ramp was there, all right, but at first he did not see it. For, as the door closed behind them it seemed, for a moment, that they had stepped directly out into space.

Save for an illuminated disc about two feet in diameter, which stood on a pedestal in the center of the place, the entire room, walls, floor, ceiling, doors and ramp, appeared transparent, or rather, to lend to their eyes the quality of X-ray vision which rendered transparent everything around them, even the moon itself. They were looking out into the universe in all directions!

The stars and planets stood out with gem-like clarity against the black background of infinite space with the Milky Way forming a jewel-encrusted girdle. Nebulae which could not be seen through the Earth's atmosphere with the unaided eye, formed cloudy wisps and spirals. The Earth seen through the floor, was nearing the end of its last quarter, the sunset line rapidly blotting out the last thin crescent of light. And the sun with its brilliant corona and undulating plumes of blazing hydrogen, was almost directly beneath them.

"And we thought our planetariums on Earth were wonderful!" exclaimed Eckers.

Lee walked across the floor to the central disc with the strange sensation that he was treading an invisible path in space. Bending over the disc, he saw that a single knob made from a transparent substance resembling quartz projected from the center, and sixteen smaller knobs of the same shape and substance were spaced equidistantly around the rim.

"Wonder what that contraption is for," said Eckers. "There's only one way to find out."

He grasped one of the smaller knobs and tried to turn it, but could not. Then he pulled it. Instantly, the knob turned pink, and the floor shook beneath their feet as if from an earthquake.

"Push it back, quick!" exclaimed Lee.

Eckers obeyed, and the knob resumed its transparent color once more.

"Wha—what did it do?" he stammered.

"For one thing," Lee told him, "it jolted the entire moon, causing a slight earthquake. Furthermore, it revealed something to me which I have been suspecting since we saw those sixteen chimneys around the rim of the moon. They are not chimneys—they are gigantic rocket tubes. They furnished the motive power that brought the moon from its original star system to our own. Obviously, they were built by the Lunites for that very purpose. And we are standing now in their central control room. Each of these knobs, when pulled, guns a rocket tube. The central knob, undoubtedly, sets them

all off simultaneously, or can be made to accelerate all simultaneously. I'd hate to risk pulling it clear back because the face of the moon is pointed directly at the Earth."

"I wouldn't if I were you."

Lee was startled at the sound of a voice behind him. Turning, he saw Morgan Kendall standing in the doorway, a bomb pistol in his hand, flanked by two of his men, each pointing a bomb gun. Simultaneously the other three doors to the room flew open, and in each doorway stood three men armed with bomb guns.

"Will you surrender peaceably?" asked Kendall, "or do we have to blast the three of you?"

"It looks as if you have the drop on us, Kendall," said Lee quietly.

"All right, pass out those two guns, breech first," Kendall ordered, and don't try any tricks. That's the stuff. Turn around, all of you, and put your hands behind your backs."

They turned, and three pairs of handcuffs were snapped into place.

"How did you find us?" Lee asked.

Kendall laughed unpleasantly. "Simple. We spotted your ship and landed. Naturally, your crew couldn't resist. They'd have been blown to atoms. With a little persuasion, one of your men was kind enough to tell us which tower you had entered. After that we simply followed your tracks in the dust. We didn't know how to work the elevator, but luckily it landed us at the right floor the first crack."

"It would," Lee replied, "if you didn't lever for any other floor. This is the end of the line."

"It is for you," Kendall told him. "For me, it is a beginning. I started out to win a race. I could complete that and win, but now I have found something vastly bigger."

"You mean—"

Kendall's eyes were shining with a strange light.

"I mean that gadget you were just playing with. I was listening to you for some time before I called to you. Your conversation was very useful to me. I started out as the master of a rocket ship. I'm a good deal more than that now—I'm the master of the moon. It will be my rocket ship from now on. With it, Morgan Kendall becomes emperor of the world."

"Delusions of grandeur," said Lee. "I always thought there was a screw loose in your brain somewhere, Kendall."

"Then think again, and ask yourself if it isn't your brain that's deficient. Why, you haven't even begun to realize what I can do with the power to move the moon about as I please. What causes the tides on the Earth? What do you think would happen if the moon moved in a few thousand miles closer, and started circling faster?"

"Kendall, you wouldn't dare."

"No? Oh, I wouldn't destroy human life unless the fools defied me. But they won't. A few good-sized tidal waves, accompanied by some earthquakes, volcanic eruptions and storms on a scale say ten times as large as anything within the experience of the human race, will serve my purpose very well. The Earth will come to terms in short order."

Kendall's chest heaved. "But enough of this talk. We've work to do. For the present you'll go back to your ship under guard. If you are tractable I may permit you to live, for you could be very useful to me. If not, I will kill you with no more compunction than if you were an insect."

CHAPTER VIII

The Moon Master

AS they emerged from the tower door, Lee saw the three rocket ships drawn up in a row.

Rita Gordon, who had been standing with a group of Kendall's men, ran to meet them, seeming almost to fly with each step.

"Good work, Morg!" she cried. "You've got them all now. You can win the race without any trouble."

"I've already quit worrying about that," Kendall replied, placing an arm around her slender waist. "I've got great news for you. You're going to be mistress of the moon and empress of the world."

She looked up at him, a puzzled expression in her big brown eyes.

"I'm afraid I don't understand."

"Haven't time to explain, now. Too much work to do. Go into the cabin and I'll tell you about it later."

"All right. I'll have tea ready for you when you come."

Without a second glance at the prisoners, she obediently returned to the *Comet*.

Speed Eckers shook his head, and addressed Lee from the corner of his mouth.

"Quick change, eh?"

"So it seems," Lee agreed, trying to keep his tones from betraying the bitterness he felt. "What I can't understand is why she called us a while ago on the radiovisiphone."

"Probably spotting the ship for Kendall."

"All right, Lieutenant Carr," shouted Kendall. "Bring all of the prisoners over here."

Surrounded by their guards, the rest of the prisoners were brought over and herded around Lee, Eckers and O'Hara.

"First of all," said Kendall, "I want you prisoners to understand that your present status is that of slaves, and that you will be treated as such. You are witnessing the beginning of a new era in the history of the Earth and the moon.

"Although you begin this era as slaves, you will not all remain so. Faithful service will be rewarded with freedom and advancement. Disobedience or slothfulness will be suitably punished. And for those who attempt to revolt or escape, the penalty will be death.

"As you all know, we have no radiovisiphone sets on any of our rocket-ships strong enough to communicate with the Earth. However, I brought with me the necessary materials and supplies for constructing such a set. All along I realized it might not be possible to get back to Earth from the moon.

"The power is already here. Although we have not yet located the plant, we see the results of its operation in this building. Your first task, then, will be to assemble this new radio station, stringing the antennae between

two of these towers, which will answer admirably for the purpose, and to hook it up with the plant that powers the electrical apparatus in this building.

"As I am in a hurry to put the plant in operation, you will work on this job until it is completed. After that you will sleep, and from then on, you will work in two twelve-hour shifts. Lawler, you will take charge of suspending the antennae and running the wires down to the control room. You, Lee, will install the control room beside the lunar rocket tube control room, with which you are familiar, and hook up with the power plant. That's all. Get busy."

He turned and strode away with the arrogant strut of a man conscious of sudden tremendous power. There had been dictators like that on the Earth in the past.

The prisoners were marched to the rear of the *Comet* and were issued rations of stew, bread and coffee. Then they were set to work.

The radiovisiphone was to be installed at the bottom level. Lee was put in charge of its construction, under the watchful eyes of Kendall's guards.

After he had the construction well under way, he left Eckers in charge of the workers, and went to look for the power lines in order to be able to connect the lunar power plant with the radiovisiphone station. The officer in charge detailed two guards to accompany him, evidently acting on orders from Kendall to keep an especially close watch on this prisoner.

Lee made an exhaustive search of the immense lower floor, and eventually found a large trap door in the floor of one of the smaller rooms. This flew open when he pressed on a stud in the wall beside it, revealing a peculiar ladder leading straight downward. This ladder had three uprights, one in the center, and one on each side, and the cross pieces, instead of being straight, curved outward forming semicircles. It was surrounded by a maze of cables and conduits which evidently powered the rooms above.

Lee started down the ladder, but one of the guards clutched him by the shoulder.

"Wait," he said. "I'll go first."

He slung his bomb gun over his shoulder by its strap and started down. Lee followed, and the other guard brought up the rear.

As the last guard descended, the trap door closed behind him. As it did so, light flashed on around them. Lee noticed that there was in this room a row of tiny tubes projecting from the circle where wall and ceiling met. Also, he saw there was a door opposite the one they had just entered.

As soon as the door closed behind the second guard, the ceiling light suddenly went out, and there was a peculiar hissing sound like escaping steam. Instantly, the room was filled with a powerful, acrid odor something like that of phenol. Lee's eyes, nostrils and lungs smarted and burned, and he clapped a handkerchief over his nose to filter the air.

"It's a trap!" shrieked one of the guards. "This is a poison gas chamber!"

Lee heard him run to the door through which they had entered, and frantically pound on it with the butt of his bomb gun. But it evidently resisted his efforts, for the darkness persisted, the hissing sound continued, and the odor grew stronger.

Just as Lee was beginning to feel consciousness slipping from him, the door in the opposite wall flew open. The three men ran toward it, then halted in the doorway. They were confronted by a room exactly like the rocket control room above them, presenting the same view of the starry firmament, and with an identical control disc mounted on a pedestal in the center of the floor.

However, this disc was completely covered by a transparent dome, and over the disc bent an arachnid the same shape and size as those in the rooms above. This creature, however, was bright orange in color with mottled markings of black and white. And although it was quite motionless, Lee had the feeling that it was alive!

As he hesitated there in the doorway, Lee suddenly felt an impelling, irresistible impulse urging him forward. He could not tell whence this impulse had come, yet it seemed to emanate from the hideous, mottled creature before him. Also, he found his own eyes focusing on the stalk-like eyes of the arachnid.

He heard the bomb guns of the two guards drop to the floor. Then the three men, treading like sleepwalkers, marched forward, and the door closed behind them. They halted just in front of the transparent dome, still staring vacantly into the eyes of the motionless Lunite.

Presently, Lee thought he heard a voice calling to him. The words were indistinct at first, and it was as if the sound came from within his brain instead of impinging on his eardrums.

Suddenly he understood. He was not hearing words but thoughts!

"At last you respond, creature of Earth," said the voice. "I was beginning to doubt your ability to do so, but it is partly my fault. I have been in a state of suspended animation for a long time, and have lost some strength, but you have brought me the means to remedy that. You need not speak, for I can read your every thought and memory, save those you have a subjective urge to conceal from me.

"I see you are wondering whence this voice comes, and who I am. I am the creature confronting you, which you call an arachnid. I am the last living individual of my race. We are communicating by means of telepathy, the universal language of the subjective mind, which knows no physical barriers and requires no physical interpretation. It is the only means of communication ever used by my race, as we have always been without vocal organs.

"I went to sleep in this cell when the earliest ancestors of your race were single-celled animalculae, blindly feeling their way about in the primordial ooze of your planet. Yet, through the medium of your mind, I am able instantly to read the entire history of your people, and so, to realize that you

have progressed far in the physical sciences, even though you have neglected the mental.

"I know all about the contest you entered, and what has happened since. We Lunites are not creatures of emotion, but we have a strongly developed sense of fair play, and are particularly opposed to those who would seek power for themselves, to the detriment of their kind. Also, I note that you have something which will be useful to me—something you yourself invented—insulite. I can read the formula in your mind, and could duplicate it if I had the materials. However, I do not dare to leave this cell—yet.

"So, because I believe in fair play, and because you are in a position to bring me something I want, I'll make a bargain with you. Bring me enough insulite to make five of your space suits, and also bring one of your air manufacturing and conditioning plants. I have no small portable plant, and it will save time. Get this for me, and I will show you a way to defeat the plans of your rival and save your world from his domination. I will show him who is the real master of the moon. In the meantime, I will take nourishment. *As your two guards have been sterilized, I can use them without fear of the fungoid death.*"

During this entire time, the creature beneath the transparent dome had not moved, standing on each side of Lee, apparently in a state of deep hypnosis. Suddenly the dome tilted backward on a single large hinge attached to the rim opposite them. When its nearer rim had reached a height of six feet the two guards walked forward until they were beneath it. Then it closed once more, and they stood before the motionless arachnid.

The latter now moved to one side of the control disc, and reared backward on its two posterior pairs of legs. The third pair reached down to a cluster of spinerets located near the center of the abdomen, and with lightning-like rapidity cast a series of silken loops around the nearest unresisting guard, until he was swathed like a mummy. The process was repeated with the second guard. Then the latter was dragged beneath the arachnid, which, after seizing him with its forceps, plunged four curved tubular jaws through the wrappings into his chest. Lee saw the blood of the luckless guard welling upward through the four semi-transparent tubes, and felt impelled to attempt the rescue of the man, even though he was an enemy, since he was a fellow-being preyed upon by a creature of an alien race.

But the voice came to him once more.

"I see you are horrified because I have chosen to feed upon two of your enemies," it said. "Your feeling results not from reason, but from one of the three basic impulses of your kind, which are the preservation of the individual, the propagation of the race, and the preservation of the race. The latter, however, is the latest to develop, and consequently the weakest. Also, there are many individuals in which it is quickly subordinated to personal needs and desires. Such an individual, for example, is your rival, Kendall. He is practically without this basic impulse—would feel no horror at the sight of two of his enemies being devoured. And, after all, why should he, or you, for that matter? Thousands of your race have been devoured by their own kind. Still greater numbers have been slain uselessly, and left to rot. And even in your modern civilization, you devour other animals whose right to live is as great as your own.

"I am not telling you this to justify what I am doing. With me, it is a matter of necessity—not choice. No other food is available at the moment, and I dare not leave this cell for the purpose of obtaining my natural food which, I assure you, is far more tasty than this. However, you will help me and help yourself more competently if you fully understand.

"Return now, by the way you came. You will tell the officer in charge of your construction crew that you have lost your guards, but have found a power line to which you can connect the radiovisiphone station. After you have slept, you will find a way to obtain the insulite for me. In the meantime, I will have finished feeding, and so will have regained my normal strength. You will then descend with the insulite, and the cable which is to be connected to the power line, and I will instruct you regarding your next move."

CHAPTER IX

Earth Attacked

HIS mind a whirl of conflicting thoughts and emotions, Lee departed from the presence of the motionless arachnid, crouched above its prey, and returned to the central auditorium.

"Where are the two men I sent out with you?" the commander of the guards demanded.

"I lost them in one of the lower levels," Lee replied. "But I have found the cables which connect with the central power station."

"You lost them? How?"

"Perhaps you'd better ask them that. They were set to guard me, not I, them."

"None of your backtalk. You're a slave here."

"A slave, then, who is merely stating the facts."

"Very well. See that you keep your place. The master will check on your facts later."

Lee wondered what the commander would think if he knew there was a real moon master with a mind far more advanced than that of any human being, who was even now preparing to defeat this arrogant, self-styled master of the moon.

Lee and his men were conducted to what had obviously been an immense arachnidian dormitory. After their arms had been manacled, the slaves were ordered into their cells.

Lee had not realized how weary and sleepy he was until he lay down in his cell, where, despite the hardness of his bed and the cares which beset him, he soon fell into a deep sleep.

It seemed only a few seconds before he was awakened by someone shaking him. To his amazement, he saw Rita Gordon standing over him. She pressed something small and hard into his hand.

"A master key for the manacles," she said. "You will need it sooner or later, no doubt."

"Wha—how did you get down here?" he asked her. "And why did you come?"

"Morg is still sleeping," she said. "The guards obey me, believing I will someday be their Empress."

"And don't you want to be mistress of the moon and empress of the Earth?"

"I don't want to see the Earth dominated by any man."

With that she left him. Lee thrust the key into his pocket.

"Eckers was right," he thought. "You just can't figure a woman. I wonder what she'll do next."

Fatigue overwhelmed him once more and he slept again. He was awakened once more, but this time by a cuff on the side of the head that made his ears ring. The commander of the guards was standing over him.

"Come out of that," he growled, "and make it snappy. The master wants you to hook up that cable at once."

"I'll have to have a space suit and five gallons of liquid insulite," he told the commander as the latter unlocked his shackles. "There's poisonous gas below, and the connections will have to be insulated."

"All right. Just so you make a quick and thorough job of it and don't try any tricks."

When Lee arrived at the central audience chamber on the main floor, he found the nearly completed radiovisiphone station humming with activity, the prisoners working swiftly under the guns of their guards. Kendall himself was supervising the work.

"All right, Lee," he said, when the latter came up. "Get that cable hooked onto the power line. We have it connected here, and are waiting for you."

The cable, with one end attached to the base of the immense radiovisiphone set, was wound on a huge spool.

"I'm sending two extra guards with you this time," Kendall warned. "And if they should happen to disappear it will be just too bad for you."

Followed by the four guards, two of whom carried the insulite and space suit, Lee rolled the huge spool down the aisle between the rows of dead Lunites, to the door. Passing through this, and two other doors, which had to be left ajar to admit the passage of the cable, he came to the trapdoor which led to the lair of the moon master. They descended.

Once again Lee saw the authentic moon master crouching motionless over the control disc beneath his transparent dome in the duplicate control chamber. At his feet lay two shrunken bundles no longer recognizable as the web-swathed bodies of the two burly guards. And Lee noticed that the body of the moon master had taken on considerable weight and rotundity.

"What's this?" gasped the corporal. "Another dead bug. But this one's a different color. Somebody put it under a glass."

The corporal had a kind of brute courage. He walked intrepidly into the chamber behind Lee, and the others followed. No slightest movement came from the creature beneath the transparent dome. But Lee noticed that his companions had stiffened as if suddenly turned to stone. Their eyes were fixed and staring, and their bodies were rigid.

Then the telepathic voice of the moon master came again to Lee, sending prickles of wonderment along his spine:

"For the present they see nothing, hear nothing, know nothing. When they leave they will have forgotten what I wish them to forget. Go, now, and connect your cable to the power line that is circled by blue stripes. Break the insulation, make your connection, and then coat it with insulite. When you have finished, bring me the rest of the insulite and the space suit."

Lee hurried back through the sterilizing chamber, located the blue-striped power line, and swiftly made the connection. When he returned, carrying the liquid insulite and the space suit, he saw that the four guards stood like graven images where he had left them. He saw the transparent dome over the moon master rise, tilt back on its hinge, and rest there.

"Bring me the materials," the moon master commanded gently.

Lee carried them forward and laid them before the arachnid.

The latter uncorked the liquid insulite. Then he tilted the bottle and, as the liquid ran out, began a rapid movement with four of his limbs. Lee found it almost impossible to follow the action. Then he saw that this living arachnid, the sole survivor of his race, was spinning the viscous insulite around him, drawing it out in fine threads and recombining it into a space suit which fitted his body and limbs. The moon master was evidently aware that insulite dried and solidified almost as soon as exposed to the air.

Presently he had spun a tough, transparent suit, completely enveloping his body save for a small space where the abdomen and cephalothorax joined. Then he swiftly recorked the remaining insulite, removed the air manufacturing and conditioning plant from the space suit, and placed it in the opening. Once more he uncorked the insulite, and spun until the plant was completely sealed in. Then he corked it once more.

"My breathing apparatus is in my abdomen," he explained. "We arachnida do not breathe through our heads as you do. Now I can leave my cell without fear of the deadly spores that slew all of my contemporaries so long ago. I will not need to take nourishment again for a long time—"

The thought message was interrupted by a terrific shock which flung Lee to the floor and bowled the four rigid guardsmen over like ninepins. It had no effect, however, on the moon master, braced on his eight powerful legs. He sprang instantly to the controls and pushed down a small lever in the side of the pedestal that supported the disc.

Lee scrambled to his feet.

"What happened?" he asked, forgetting in

his excitement that it was not necessary for him to speak.

"Your enemy worked faster than I thought he would!" The soundless message flashed to Lee's brain. "Evidently he made his demands upon the nations of your world as soon as you connected his radiovisiphone to the power line. Evidently also, those demands were refused. At any rate, he has just pulled the central rocket control knob, and the moon is now moving in toward the Earth."

For an instant Lee was speechless before this calmly made announcement.

"Can't you stop it?" he then cried, forgetting again that he had no need for speech.

"I've already shut off his control room," the moon master replied. "The little lever at the side of the pedestal cuts it off completely when pushed down. Now I'll get the moon back into its orbit. In the meantime, if you like, you may watch what is happening on Earth. Come here and look into the top of the disc."

Lee went forward, his heart pounding, and looked into the disc. It was blank when he first looked, but the moon master gave the central knob a slight turn, and it was then as if he were looking through powerful spy glasses from a point only a few miles above the Earth.

He saw the coast of Brittany, toward which an immense tidal wave was advancing across the Atlantic! It broke on the shore, turned into a huge roller and swept over the beetling cliffs inundating the land beyond!

"Too late to save those people," the moon master said without agitation, manipulating the dials. "But we'll soon have the moon back in its orbit, and the disturbances on your world will gradually subside."

Lee's range of vision crossed Italy. He saw inundated land, and a dozen volcanoes belching smoke and fire. A terrific storm was roaring over the Mediterranean, and there were incessant flashes of lightning.

The moon master was manipulating the control knobs that operated the various rocket tubes. A row of these were gunned on one side, and the moon swung on its axis. The universe visible through the walls, floor and ceiling of the room, seemed now to swing around them.

"Your ambitious enemy has slain a great many of your fellowmen," said the moon master. "No doubt he probably thinks now that something has gone wrong with his controls. It is a good time for you to return with your guards. In order to get rid of Kendall you will have to risk losing your rocket ship—perhaps your life as well. If you are willing to take these risks, and to cooperate with me, I will tell you of the best plan I can think of at the moment."

The moon master paused in his thoughts, then went on:

"The moon is now back in its orbit, so you need not worry about that. Presently, after you have gone back to the audience chamber, you will go into the duplicate control room there, which is now dark. I will be in telepathic *rapport* with you. Kendall will want you to repair the controls. Ask to be left there alone, and I will then switch them back on."

"But are you going to permit Kendall to kill more people on Earth?" Lee asked, this time without speech.

"Definitely not," the moon master replied. "I only want him to think he has the power to do so. As for the rest of the plan, it will be as follows—"

CHAPTER X

Earth Surrenders

ACCOMPANIED by his four guards, who walked stiffly, like automatons, Lee passed through the sterilization chamber and out into the room where he had connected the cable to the power line. He carried what remained of the insulite. With the instructions of the moon master fixed indelibly in his mind, he bent over the connection, applying a bit of insulite as if he were just finishing the task. As he did so, the three guards snapped awake.

"Hurry up with that job!" growled the corporal. "The master will be furious!"

"It is finished," Lee replied. "Let us go back upstairs."

Not one of the four men appeared to miss the space suit they had taken down with them, or to remember a thing about what had happened in the sterilization room and the lair of the moon master.

When they reached the central audience chamber once more there was considerable excitement around the radiovisiphone set which Kendall himself was manipulating. He turned suddenly away from the disc and held up his hand for silence.

"I have won!" he shouted. "The Associated Governments of the World have agreed to my terms! It is a time for celebration! Tonight we will wine and dine! Tomorrow the *Shooting Star* will carry my chosen viceroys to the Earth, to rule and levy tribute. Something has gone wrong temporarily with the rocket controls, but the Associated Governments of the World know nothing about that. And we'll find a way to repair them. We have enough men of science among us for that."

His fanatical gaze flashed to Lee.

"Good work, Lee!" he said. "You did a good job on that connection. Continue to serve me as well and you will advance rapidly. I may even make you one of my viceroys."

"Where are the other prisoners?" Lee asked.

"They are in their quarters, being fed," Kendall replied. "This job is finished, and I'll have no more work for them until tomorrow. Rita seems to have taken a sudden fancy to dietics, and is overseeing their feeding. Too bad. She was not here to witness my triumph. But she'll know of it, soon."

"Something go wrong with the rocket controls?" Lee asked casually.

"They went dead. If you can fix them you will be handsomely rewarded."

"I can try," Lee replied.

He walked to the nearest door in the base

of the control tower, and it automatically opened as he drew near. Within all was darkness.

"I'll send in a man with a light," offered Kendall.

"Don't bother," Lee replied. "I'll have the lights on inside in a moment."

As soon as the door closed behind him the light flashed on in the central control disc, and once more the walls lost their opacity, clearly revealing the universe around him. He waited a few moments, then returned to the door, which again opened automatically.

"All right, Kendall," he said. "Your controls are working once more."

Kendall stared at him in amazement, his smile of approval suddenly changed to a glare of rage.

"You have made a very foolish mistake," he said. "To you I am not 'Kendall' but 'Your Imperial Majesty.' I had intended to reward you with full liberty tonight, and a part in our victory feast. But now, I regret to say, you must be punished." He called to the corporal who had conducted Lee to the cable room and back. "Shackle him, corporal," he ordered, "and confine him with the rest of the prisoners."

Lee held out his hands for the shackles. It was not yet time for him to strike. Then he accompanied his guard via the elevator to the dormitory. Here he found Rita in charge of the men who had brought the food.

She looked up in surprise as Lee approached with his arms in irons.

"Why the shackles, corporal?" she asked. "This prisoner has not yet been fed."

"Master's orders, mistress," the corporal replied respectfully.

"Oh, well," she said, "I suppose he can eat with his shackles on. You may go, corporal."

Glad to be relieved of his charge, the guard hurried away.

"I'll open your shackles for you," she whispered.

"I could open them myself, thanks to you," he whispered. "Listen, Rita. After the banquet tonight, don't sleep aboard the *Comet*."

CHAPTER XI

The Moon Master Acts

DESPITE his weary, aching muscles and heavy eyelids, Lee remained awake in his cell for six hours, during which time he heard only the monotonous pacing of the guard in the hall.

At last, noiselessly, he unlocked his fetters with the key Rita had given him. He waited until he knew the guard was at the end of his beat, then moved stealthily to the door. The guard was on his way back. At the right moment Lee sprang into the hallway and brought the heavy shackles down upon the head of the sentinel, who slumped into insensibility. He grabbed the man's bomb gun.

Swiftly then, he dragged the body inside and hid it behind the door. Then he sprinted over to the sleeping cells and unlocking the fetters that bound Eckers, shook him awake. His co-pilot sat up sleepily.

"What the—" he began.

"Take this key and start releasing the others," said Lee.

"In fifteen minutes take the elevator to the top of the tower. If the *Streak* and the *Comet* are gone, you can take charge of the *Shooting Star*, as there are not likely to be any of Kendall's men aboard her. With the *Shooting Star*, you will be able to return to Earth."

"But where are *you* going, skipper?" asked Eckers. "And what's going to happen to the *Streak* and the *Comet?*"

"Just be a good soldier, carry out orders, and don't ask questions," Lee told him. "You'll learn all of the details later, whether my plan works or not."

He hurried off to the elevator, and waited close to the door until it opened. He pressed the "up" lever for the top floor.

Arriving at the top floor, he stepped out. There was no one in sight. Silently, he went up the ramp that led to the tower. No one here. He walked close to the door, then caught and held it as it began to open automatically, and peered out. A guard was on duty here and at the moment his back was toward the door. He weaved unsteadily as he walked, and Lee suspected that he had been imbibing heavily at the banquet. The guard unexpectedly turned, and spied Lee peering out the door.

He started unsteadily for a moment, unable to credit the evidence of his senses, then started to swing his bomb gun down from his shoulder.

But before he could get his gun in line, Lee had sprung in close, and swung his fist. The man dropped, his head struck the floor. He was out—permanently. Lee appropriated the bomb gun.

He left the tower. All the lights aboard the *Shooting Star* and *Streak* were out. The prow and stern lights of the *Comet* were lighted, and through her open airlocks came snatches of a maudlin ditty. Evidently, although the banquet had been over for some time, a few late celebrants were still able to raise their voices in song.

Crouching low and praying that he would not be seen, Lee sprinted across to the *Streak*, climbed the ladder that led to her port bridge, and plunged through the open airlock. He started the atomotors that closed the inner and outer doors, and then ran to the control room. Strapping himself in his seat, he examined the gauges and levers by the light that shone from the control cabin of the *Comet*. Finding everything in order, he gunned the rear atomotors and the forward levitor tubes, and the *Streak* hurtled forward and upward.

IN his luxurious cabin aboard the *Comet*, Morgan Kendall sat with his first lieutenant, Oscar Carr, and several other officers, finishing the last bottle of champagne.

"Gonna make you vish—viceroy of United Statesh, Carr," Kendall proclaimed loudly. "Whadda ya think of that, eh? How do you like being emporsh' favorite? You, Hewett, I'll make vish-viceroy of Great Britain.

Pretty nice, eh? We'll have a drink on that one, and sing 'Bashful King of England.' I'll pipe the tenor. You lead, Hewett. Come on, lesh—"

He was interrupted by a loud roar from outside.

"What the devil was that?" he asked, suddenly sobered.

The port airlock guard came running.

"It's the *Streak!*" he cried. "The *Streak* is gone."

"Must be that damn' Lee," said Kendall. "I should have had him shot tonight. But he can't get far. Come on, Oscar. We'll catch him and blast him to hell."

Shocked into sobriety, Kendall hurried to the control cabin, followed by Carr. They strapped themselves in their seats and the captain of the *Comet* gunned her powerful atomotors and levitor tubes. As she roared off into the sky, he ordered Carr to rouse the gunners and have them stand by to man all of the space guns.

Scarcely had Carr left the cabin to carry out his orders when the buzzer on his radiovisiphone sounded, and Kendall switched it on.

The smiling face of Jerry Lee appeared in the disc.

"Hello, Kendall," he said. "It looks as if the *Streak* is going to win this race after all. What do you think?"

"I think this is going to be your last flight," Kendall replied between clenched teeth. "A few minutes more and we'll be within range of your craft. Flying without lights won't help you. I'll run you down sooner or later."

"That's what *you* think," Lee grinned. "As for flying without lights, I only did that to get out from under your guns. Here go my lights on, now, all of them."

"Well, you *are* a damned fool, aren't you," said Kendall, as he saw the lights of the *Streak* far ahead of him.

An instant later his radiovisiphone disc went blank. Then the lights of the *Streak* flashed off. But they appeared a moment later, flying in another course. After that, as the two ships sped across the dark bowl of the moon, the lights of the *Streak* flashed on and off again and again, now in one direction, now another, as if a number of gigantic fireflies were flitting about ahead of the *Comet*.

With his powerful atomotors gunned to the utmost, Kendall was slowly gaining on the dodging, twisting *Streak*. He did not know that Lee was not using his full power, but he did know that his dodging would, in the end, shorten the distance between the two ships. And then he would bring his space guns into play.

Presently the *Streak* shot up out of the bowl, and across the rim of the moon, with all of its lights blazing. Lee was traveling in a straight line, now, and Kendall, following close behind him, saw that he was within range. He barked an order into his control mike:

"Begin firing from the forward turret."

MEANWHILE, deep in his lair beneath the tower, the moon master sat peering into the top of his control disc. He was watching the flight of two rocket ships, one small, the other much larger. The larger was pursuing the smaller, which dodged and twisted, flashing its lights on and off from time to time.

Presently the moon master saw the smaller ship rise and fly straight across the rim of the moon, with all lights blazing. Behind it hurtled the larger ship. Suddenly, just as the latter hung over the rim, its forward turret guns spat fire. And, at that instant, the claw of the moon master seized and pulled one of the small control knobs in the side of the disc. A terrific blast followed —a blast so powerful that although it was from a single tube, it started the moon turning on its axis.

But the moon master was not interested in that. What interested him was the fact that at the instant he had opened that lever, the pursuing rocket ship had been directly above the center of the gigantic rocket tube. Now that cruiser, turning end over end, was hurtling out into space with a velocity so swift that even the practiced eyes of the moon master, aided by his wonderful visiscope, could scarcely follow.

He pushed the lever back into place, shut off the visiscope, and abstractedly watched the universe slowly turning about him due to the moon's accelerated rotation on its axis. He computed that if he permitted the moon to continue at this same rate, its days and nights would be the same length as those on Earth. Perhaps if he left it that way, these Earthlings would like it better here, and he could induce some of them to stay. It was pretty lonesome with no living creatures left save the feral inhabitants of the lunar seas and jungles.

WATCHING through his rear-view periscope, Jerry Lee saw the flash of flame from the *Comet's* forward turret. Instantly, he went into a swift dive to avoid the projectiles, and watching through his keel periscope, he saw the terrific blast from the lunar rocket tube which sent Kendall's rocket cruiser hurtling end over end out into space. Kendall, he knew, would not be able to check the terrific momentum thus imparted to his heavy craft until he had traveled so far he would not have fuel enough to bring him back.

As he hurtled back across the rim of the bowl over which he had lured Kendall at the instigation of the moon master, Lee noticed that the moon's axial rotation had been speeded up as a result of the blast, and reflected that it would be a good thing if it were regulated to stimulate Earth days.

He could scarcely wait until he got back to the central tower, to ascertain what had occurred there. Yet he did not dare accelerate too much, or it would be impossible to land.

Presently he saw the *Shooting Star* with all of her lights blazing, resting on top of the tower. And shortly thereafter, he skimmed over the wall, skidded across the top of the tower, and brought the *Streak* to rest beside the other rocket ship.

Impatiently he waited for the two airlock

doors to open. Then, carrying his bomb gun, he leaped out on the bridge and ran down the ladder to the ground. Instantly, he saw that the gun would not be needed. A great crowd had swarmed out of the *Shooting Star* to greet him. There were Captain Lawler, and Speed Eckers, and Bill O'Hara, and many others, and it seemed that everybody was shaking his hand and slapping him on the back at once. But, best of all, there was Rita, who ran to him, flung her arms around his neck, and kissed him before everybody.

He held her close, and everyone shouted approbation.

"It looks as if you are not going to be mistress of the moon or empress of the Earth," he whispered. "But would you be willing to be assistant cook on the *Streak?*"

"I'd love it," she answered.

Lawler, who had been stroking his pointed beard and grinning, now came forward.

"Let me be the first to congratulate you, Lee," he said, "and to wish you joy, Miss Gordon. Incidentally, I want to say that the *Shooting Star* is not returning to the Earth at present, and of course, lays no claim to any part of the prize for the race. You may complete that at your leisure, and claim the prize. I wish to remain here to conduct further scientific investigations. Possibly I shall colonize the moon. I notice that last rocket blast which was set off so mysteriously, has started the moon rotating on her axis at the rate which our instruments indicate to be about twenty-four hours a day. If it continues that way, and I see no reason why it shouldn't, unless further blasts are fired to stop it, it will make a very pleasant place to live—and an exceedingly interesting one."

"Thanks, Lawler," said Lee. "If you're going to stay, we'll be off. Good-bye, all of you *Shooting Star* men, and good luck."

In his lair beneath the tower, the moon master was observing the scene through his visiscope. And, although he did not come of an emotional race, he felt strange emotions stirring in his arachnoid heart. He saw the airlock close behind the last member of Lee's crew—saw the *Streak* vanish in space. Then he switched off his visiscope and resumed his brooding. For the moon master, the last living member of an ancient race, had much to think about—many plans to perfect for the future of the world which he and his long dead brethren had brought into the Solar System.

HEADLINERS IN THE NEXT ISSUE

PLUTO! The coldest world in the Solar System—the planet of perpetual darkness!

Two and a half million Earthmen lived on that frigid, dead world. The intrepid colonists of man's last outpost, their native planet three billion miles away!

Each two weeks, for fifteen years, a space ship had landed on Pluto, bearing thousands of tons of supplies across the infinite void.

Now, suddenly—the chain was broken. The power-line that led to Earth—and life. The ships had stopped arriving! There was no escape, no help, save what they could wrest from the dead world. There was no food, no water, no air, no heat and—no life. . . .

THE PLANET OF ETERNAL NIGHT, a complete interplanetary novel in the next issue of THRILLING WONDER STORIES, is a powerful saga of men against the elements. Written by John W. Campbell, Jr., creator of the famous Penton-and-Blake series, this is the most distinguished novel ever to come from this author's pen.

* * *

There are pyramids on Earth . . . pyramids on Mars. And now—pyramids on Venus! What is the answer to this cosmic enigma? What strange race of intelligent beings marked the planets with these giant landmarks?

Venus Expedition Number One embarks from Earth to solve this baffling solar secret . . . and brings you an amazing chronicle.

VIA VENUS, an "etherline" story by Gordon A. Giles, in our next issue, is an absorbing tale of the pioneers of space.

* * *

Nobody knows what happens when an irresistible force meets an immovable object. Yet that's exactly what occurs when Tony Quade sets out to shoot a scientifilm starring Gerry Carlyle, the Catch-'em-Alive damsel! Gerry Carlyle proves to be as hard to get as a Venusian whip in this scintillating story of Hollywood-on-the-Moon.

Arthur K. Barnes and Henry Kuttner have combined their two cinema characters in a highly entertaining novelet, THE ENERGY EATERS, to be published complete in the next issue. It's Quade vs. Carlyle, a double feature, with camera, lights, and action!

* * *

"Philadelphia has vanished from the face of the Earth—or very nearly so. As a matter of fact, I suspect it still exists, but in such a form that it defies all human credibility. No one knows which city may vanish next . . . it may be Trenton, Scranton, or even New York itself. . . ."

So spoke Professor Manning, dean of science. And his grim warning heralded the sinister menace that was to become known as—THE SCOURGE BELOW.

Science of the future defies the challenge of an invisible enemy in THE SCOURGE BELOW, a novelet of subterranean rule by Sam Merwin, Jr.

* * *

Other novelets and stellar short stories in the October issue of THRILLING WONDER STORIES. And all our streamlined exclusive features—SCIENCE QUIZ, SCIENTIFACTS, IF, THE STORY BEHIND THE STORY, and others! It's a star-studded issue from first page to last. And don't forget—there's a long complete novel in every issue of THRILLING WONDER STORIES!

Science Questions and Answers

COSMIC COLLISION

Editor, SCIENCE QUESTIONS AND ANSWERS:

Many astronomical theories have been presented to explain the origin of the planets, and the birth of our Earth. Of all the theories known to science, which is considered to be the most logical?—L. D., Englishtown, N. J.

The "Tidal Theory" of Sir James Jeans, which is based on the premise that a collision between our sun and another cosmic body resulted in the formation of our Solar System, seems to be one of the more rational theories known to science.

Astronomy tells us that each of the stars in our skies is moving as an individual, in various directions, across the heavens. The sun, which is the center of our system of nine planets, is not fixed in space, but is also moving—at the speed of twelve miles per second. Our sun—and its planets—is moving, together with millions of other suns, toward Vega. By chance, then, with myriad suns moving like a milling crowd of people, one might come quite near another—will, it is certain, if enough time is allowed.

Such an encounter, however, is a rare phenomenon of Nature. Eddington's surveys indicate that it may happen to only one out of about a hundred million stars. But Jeans postulates that such was the case in the dim past—that some two million years ago such a cosmic collision did take place.

The wandering celestial visitor came perhaps closer to the sun than Neptune and raised a gigantic tide on the sun's surface. Not a small tide, as caused on our oceans by the moon, but a high tide in the sun like a mountain range swept over the solar surface, higher and higher until the crest of the wave and the "spray" flew away from the gravity of the sun to swing into the orbits now followed by the planets. These tiny globules were to cool gradually and form the Solar System, planets, planetoids, satellites, perhaps comets and meteors.

The passing star, Jeans goes on, certainly must have come within several diameters of the sun. A great deal of the material fell back with the recession of the tide but enough could have been thrown off to form the Earth and its neighbors.

In a variation of this theory, Jeans suggests that the attraction of a passing star drew a long filament out from the sun. This, breaking up, would form some small and some large bodies, resulting in our Solar System.—Ed.

CARNIVOROUS PLANTS

Editor, SCIENCE QUESTIONS AND ANSWERS:

I've read a number of science fiction stories wherein experiments by a zoologist result in the creation of a giant plant which gets out of hand and becomes a man-eater. Isn't this a trifle too far-fetched? Or are there examples in nature which would illustrate such a possibility? What about the famous Venus fly trap, for instance?—C. A., Clearwater, Florida.

There are a number of flowering plants known to botanists which not only capture small organisms, but have the power of digesting and assimilating the organic food thus obtained. These plants do not constitute a single group but belong to various plant families and exhibit several kinds of structural provision for capturing prey. This prey generally consists of small insects, but in some instances of other small animals—minute freshwater crustacea, isopods, worms and various aquatic larvae, and, it is said, even small vertebrates—captured either like flies on sticky fly paper, or by a trap mechanism, or by drowning.

The Venus fly trap you refer to is one of nature's classic examples. The leaf of this plant is bilobed. On its margin are sharp teeth or spikes, with two or three hairs on the leaf. These hairs are extremely sensitive and function as triggers; the instant they are touched the two lobes of the leaf close, locking the spines together. The insect that sets off this mechanism becomes its prey. The leaf remains closed and is converted into a virtual stomach and the glands on the upper surface of the leaf come into action until all the soft parts of the prey are liquefied. A Venus fly trap has been observed holding fast in its grip a small frog. This plant is a native of North Carolina.

Much more conspicuous carnivorous plants are the pitcher plants, of which there are two distinct types, one of the northern hemisphere, the other of the oriental tropics. The two types belong to different families but agree in one important respect: the leaf or part of the leaf of each is converted into a pitcher, containing a fluid in which insects and other small animals drown and become digested.

The northern pitcher plant consists essentially of a clump of pitchers, six inches to two feet or more in height, according to the species. The tropical pitcher plants are much taller, with a central stem and foliage like a corn plant. From a tendril-like prolongation of the midrib of the leaf, curious jugs or pitchers hang suspended, one from each leaf. A small leaf-like flap like a lid covers the mouth of the pitcher. The flowers are fragrant, brightly colored, and attract insects, which find their way into the pitchers and may be utilized by the plant.

One of the rarer types of pitcher plant is the striking **Nepenthes Veitchii** which grows as an epiphyte on the larger branches of trees. It produces a bag-shaped pitcher about ten inches in length, rather wide and blotched with blood-red patches. The mouth of the pitcher in this species is its most conspicuous and remarkable part that, by its rich orange color and its vertical position, becomes a perfect trap for enticing insects at a distance.

(Concluded on Page 129)

THIS department is conducted for the benefit of readers who have pertinent queries on modern scientific facts. As space is limited, we cannot undertake to answer more than three questions for each letter. The flood of correspondence received makes it impractical, also, to promise an immediate answer in every case. However, questions of general interest will receive careful attention.

WE'D like to talk about an experiment. It's an experiment that wasn't conducted in a scientific laboratory—but in the pages of THRILLING WONDER STORIES! An experiment shared by every reader of this magazine!

In the last issue we shattered ten years of tradition by presenting a long complete novel in special section form—a brand-new event in the science fiction world!

The inauguration of this revolutionary policy was a daring step. Yet it was no impulsive gesture, but a move we had been contemplating for over two years.

From time to time great stories have reached our sanctum. These stories were excluded from the pages of T.W.S. because of their extra length. For space is precious, and the publication of a long novel would have meant the omission of one of our regular novelets, short stories, or features.

A problem faced us. How could we give our readers these great novels?

The opportunity presented itself sooner than we had anticipated. What better place to launch our experiment than in the Tenth Anniversary Issue? Stanley G. Weinbaum's fine novel, "Dawn of Flame," was published complete in special compact section form in that number, marking a new milestone in the evolution of science fiction.

Hundreds of congratulatory letters from readers all over the world attested to the tremendous success of our experiment.

And so, here's the big news! Every issue of T.W.S. from now on will feature a long, complete science fiction novel, in addition to our regular lineup of star novelets, short stories, and features! Written by such prominent authors as John W. Campbell, Jr., John Taine, Eando Binder, and Jack Williamson, each will be published in a special section, illustrated by the leading fantasy artists in the field!

We'll keep right up to the high standard established by our Tenth Anniversary Issue—the issue you have acclaimed as the most distinguished achievement of any science fiction magazine ever published!

MOST POPULAR STORY IN JUNE ISSUE

Here, in each issue, THRILLING WONDER STORIES names the most popular story in the preceding issue.

The best-liked story in the Tenth Anniversary Issue, based on an analysis of all letters sent to the editor, was:

THE ULTIMATE CATALYST
A Novelet
by JOHN TAINE

Second and third places, respectively, went to JOHN COLEMAN and HULBERT BURROUGHS for THE MAN WITHOUT A WORLD and STANLEY G. WEINBAUM for DAWN OF FLAME.

Which do you consider the most outstanding science fiction story in this issue? Whether it's a novelet, short story, or short short—your vote will designate your favorite story.

NEW COVER CONTEST!

Notice the cover on this issue?

It's by Artist Brown, based on one of his own original ideas—and it suggests many intriguing situations.

THRILLING WONDER STORIES is offering big cash prizes for the three most interesting interpretations of this cover painting.

We give you no clues as to what the picture represents, and you will have to use your own ingenuity in creating a story based upon it.

Can you write a simple letter, of not

more than 1500 words? That's all you have to do to be eligible for participation in this unique contest. You don't have to be an author! Literary skill and flowery language are not necessary! We want you—the readers and followers of THRILLING WONDER STORIES—to tell us, in short letter form, just what kind of a science fiction story Artist Brown's cover suggests to you. That's not too difficult to do, is it? A few minutes of your time may land you the first prize—$25.00!

There's a splendid chance for everyone. The second best letter will reward its writer with second prize—$15.00. And there's a third prize of—$10.00!

There will also be five additional prizes for honorable mentions. The authors of these five letters will each receive FREE a year's subscription to THRILLING WONDER STORIES.

Each of these prize-winning letters, we know, will be a most entertaining treat for our readers; for the simple reason that all the letters are bound to explain the cover in unusual ways.

So here's a contest in which everyone can compete. (Professional writers are ineligible, of course.) Merely write a letter of not more than 1500 words in length and you may win a big prize. The winning letters will be published in an early issue of T. W. S.

The closing date for this contest is August 7, 1939. All entries must be mailed by midnight of that date. Send your letters, typewritten, penned, or penciled to: COVER CONTEST EDITOR, THRILLING WONDER STORIES, 22 W. 48th St., New York City. In case of a tie, identical prizes will be awarded to each of the tying contestants. Decisions of judges will be final. No letters can be returned.

Send us your letter today!

STARTLING STORIES

The coming September issue of STARTLING STORIES will feature a novel by one of your favorite authors —Robert Moore Williams. He's written a top-notch science-fiction mystery novel of the future—THE BRIDGE TO EARTH—and you'll find it a worthy successor to the many excellent novels that have already appeared in that magazine.

The September issue of STARTLING STORIES will also present other science fiction winners by leading authors. Then, too, there's a four-star hit from fantasy literature appear-

THE WORLD'S FAIR SCIENCE FICTION CONVENTION

For the Advancement of Science Fiction

IF you can possibly get to New York City on or about this July 2nd, 3rd and 4th, then you're in for the greatest thrill in the history of science fiction fandom!

Fantasy fans the world over have combined their efforts to present THE WORLD SCIENCE FICTION CONVENTION, in conjunction with the New York World's Fair. Science fiction fans from all parts of the United States, Canada, Mexico, and England, have already reported their intentions to attend this noteworthy Convention, and this project deserves your heartiest support.

Come meet the leading authors, artists, fans—and the editors. Hear what Ralph Milne Farley, Manly Wade Wellman, Willy Ley, Edmond Hamilton, Jack Williamson, Frank B. Long, Jr., and many others have to say regarding science fiction, its past, present and future.

There will be many items of special interest to fantasy fans at this Convention. Original cover paintings of various magazines on display . . . rare original manuscripts and drawings . . . out-of-print science fiction classics.

There will be a showing of METROPOLIS, the greatest scientifilm ever made. And there are many other surprises and treats in store for every science fiction follower who attends this three-day Convention.

Remember the dates: 10 A. M., July 2nd, 3rd and 4th, 1939. The Convention Hall is at 110 East 59th Street, East of Park Avenue, New York City. Admission FREE.

We'll be seeing you!—THE EDITORS

Note: Non-residents of New York City are advised to communicate with Mr. Sam Moskowitz, Director, 603 So. 11th Street, Newark, New Jersey, if they are planning to attend.

ing in SCIENTIFICTION'S HALL OF FAME.

You'll find S. S. crammed with interesting, scintillating features! Jack Binder's illustrated feature, THEY CHANGED THE WORLD, will acquaint you with the exciting life story of Alfred Bernhard Nobel, inventor of dynamite. And then there are THRILLS IN SCIENCE, THE SCIENTIFIC CROSSWORD PUZZLE, and a science editorial by Jack Williamson.

Remember, THE BRIDGE TO EARTH is a booklength novel, published complete in one issue!

AMATEUR STORY CONTEST

Elsewhere in this issue appears COSMIC CUBE, a prize-winning story in our contest for amateur science-fiction writers. Another prize-winning story, HADES, by Charles Ksanda, will appear in the next issue.

THRILLING WONDER STORIES is the only national science fiction magazine publishing stories by its own readers! We believe that every one of our followers has at least one story that would make interesting reading. We want to see that story, and if it's enjoyable reading we'll be glad to publish it. Here's a chance for all you fans to see your own story in print in your favorite magazine. Three of your fellow-fans have already rung the bell —why not you?

Write up that pet plot you've been keeping to yourself all these years. We'd like to see it. If there's something to your story, you will have the gratification of seeing it published in T. W. S., and the—check! Prize stories are purchased at the same rates paid to our staff writers.

The requirements are simple. Authors must be amateurs. Anyone who has ever had anything published professionally is not eligible. Type your stories double-spaced on regular manuscript paper. And enclose a stamped, self-addressed envelope for the return of your manuscript if it is unavailable.

Mail your stories to AMATEUR WRITERS' EDITOR, THRILLING WONDER STORIES, 22 W. 48th St., New York City. We want to present a brand-new writer in every issue. Why not try for the honor?

Winner of the most recent contest is Mr. Charles F. Ksanda, of 1616 Van Buren St., N. W., Washington, D. C.

Honorable Mention: Harry Warner, Jr., 311 Bryan Place, Hagerstown, Maryland; Walter W. Saville, 2262 North 17th St., Phila., Pa.; George Duff, 394 Glenn St., Fresno, California.

JOIN THE LEAGUE

Have you joined the SCIENCE FICTION LEAGUE yet? It's an international organization composed of the world's most enthusiastic followers of

science fiction—and it fosters that intangible bond between all science fiction readers. Just fill out the application blank provided on Page 119.

To obtain a FREE certificate of membership, tear off the namestrip of the cover of this magazine, so that the date and title of the magazine show, and send it to SCIENCE FICTION LEAGUE, 22 West 48th Street, New York, enclosing a stamped, self-addressed envelope.

And readers—write the editor of THRILLING WONDER STORIES a regular monthly letter. We want all your suggestions and criticisms. They are helping to make T.W.S. the magazine you like best—THE EDITOR.

SCIENCE FICTION LEAGUE NEWS

THE QUEENS SCIENCE FICTION LEAGUE MEETING OF APRIL 2ND, 1939

Meeting was called to order at about 3:30 P.M., minutes were read and dues collected. Director announced that VADJONG is again delayed, and at the next meeting two issues will be passed out.

Walter Sullivan, our amateur fotographer member, left us at this meeting, for Oklahoma, but if possible, he said, will attend the Convention. A motion was passed that the Convention Committee meet every Friday, until the Convention. Plans for a great membership drive was also made. Sam Moskowitz made a motion, that of forming a soft-ball team by the members of the Queens SFL. The Motion was enthusiastically passed, and a name voted on is THE QUEENS COMETEERS. The team is challenging the PSFS PANTHERS, of Philadelphia, to a game at the World STF CONVENTION.

Conrad H. Ruppert was voted in as a member of the Queens SFL. Others attending this meeting were Ali Hassen, and Otto Binder. Mr. Binder spoke on his stf writing, and also stated that he'll join the QSFL, later in the fall.

A Committee consisting of Will Sykora, Moskowitz, Giunta, and Taurasi, and Julius Schwartz, to represent officially NEW FANDOM and the QUEENS SFL, in matters pertaining to professional magazines, was choosen.

Meeting adjourned at 5:15 P.M.—MARIO RACIC, JR., Sec'y-Treas.

LOS ANGELES CHAPTER ANNOUNCEMENT IN REGARDS TO MEETINGS

We know this notice will cause plenty of confusion, but it can't cause more then it already has. **HOLLYWOOD MEETINGS** were dispensed with due to the impossibility of finding a cheaper room, though attendance was soaring. Therefore, the club now meets in Los Angeles four times a month. **THURSDAY MEETINGS** are as they always were, 1st and 3rd Thursdays of each month at Clifton's Café, 648 S. Broadway, Los Angeles, Little Brown Room, 3rd Floor, Rear. Anytime from 6:00 on. **WEDNESDAY MEETINGS** are held at the same place, same time, but on the 2nd and 4th Wednesdays. If you can't come to one set, come to the other.

MEETING OF APRIL 6, 1939

Twenty-two members showed up for this occasion. Guests of the evening were a **Mr. Laurence Chandler and Mr. Lawrence Harper,** who are investigating the scientifictional field's publishing aspects. Fans may soon hear of an amazing plan for scientifictional book publishing, which may come out of this visit.

INFORMATION may be had about meetings by contacting Secretary, T. Bruce Yerke, 1223 Gordon St., Hollywood, California, or phone Forrest J. Ackerman, FEderal 2231 after 6 in the evening. Remember, we have four meetings a month to serve the ever-growing scientifictional audience in Los Angeles and vicinity.

METROPOLIS!

Members of the LASFL saw the famous old scientifiction classic, **METROPOLIS,** on Friday night, April 28, 1939, at the New Academy Review Theater in Hollywood. Twenty persons, all told, attended this special showing, meeting at the home of the Secretary at 8:00 and walking up to the studio, which was only two blocks away. Other films scheduled are "Tabu," "Cabinet of Dr. Cellegri," and many others.

NEW MEMBERS
UNITED STATES

Joseph G. Sauter, Pasadena, Calif.; Marjorie Von Baltzer, Conway, N. H.; Norman Cobert, Brooklyn, N. Y.; G. S. Bunch, Jr., South Bend, Ind.; Abe Berg, Canton, N. Y.; Earl G. Campbell, Fresno, Calif; Robert J. Martin 3rd, Southland Hills, Towson, Md.; Jack J. Rubin, Van Nuys, Calif.; Elias Scheinberg, Brooklyn, N. Y.; B. W. Thomas, East St. Louis, Ill.; Geo. B. Lucas, New Orleans, La.; W. R. Carey, Berkeley, Calif.; Carroll E. Clark, Jr., Jasper, Ark.; Vero Eric, New York, N. Y.; Harry M. Nierling, Jamestown, N. D.; Edwin Rothouse, Philadelphia, Pa.; Paul Laing, Kalamazoo, Mich.; John Biddle, Philadelphia, Pa.; Virginia Schwartz, Corinth, Miss.; Sherman Schultz, Jr., St. Paul, Minn.; Albert A. Frost, Rumford, Maine; Paul Gerbracht, Erie, Pa.; David G. Markham, Castaic, Calif.; Norman Spector, Jersey City, N. J.; Jack Townsend, Wilson, N. C.; Robert L. Burnett, Chicago, Ill.; Neil A. Lafferty, Jr., Brooklyn, N. Y.; John F. Scully, Point Lookout, N. Y.; George Connell, New York, N. Y.; Lawrence Alfonsin, Brooklyn, N. Y.; George Lanko, Chicago, Ill.; Lewis B. Martin, Denver, Colo.; John A. Lapsansky, Elmhurst, Pa.; Ernest Kay, Chicago, Ill.; Thomas Phair, Pittsburgh, Pa.; Robert Brubeck, Cleveland Heights, Ohio; John A. MacEwan, Keyport, N. J.; Miss Edna Maxwell, Huntington, W. Va.; Willard Dewey, Everett, Wash.; Carroll Johnston, Jr., Oklahoma City, Okla.; Andrew DeVos, Detroit, Mich.; Vahan Shirvanian, Newark, N. J.; Marta Jean McGee, Ft. Worth, Tex.; R. Ackermann, Florissant, Mo.

FOREIGN

Herbert Dudley, Westmount, Que., Canada; Julian F. Parr, Shelton, S-on-T, Staffs, England; F. L. Barnes, Brockton, Stafford, England; Hector Savard, Rosemount, Montreal, Canada; Terry Pease, Boksburg, Tul., South Africa; W. B. Cooke, Letchworth, Herts, England; S. F. LeRoux, Vereeniging, Transvaal, South Africa, Francis Simpson, Rhyl. Flints, N. Wales.

APPLICATION FOR MEMBERSHIP
SCIENCE FICTION LEAGUE

Science Fiction League,
22 W. 48th St., New York, N. Y.

I wish to apply for membership in the SCIENCE FICTION LEAGUE. I pledge myself to abide by all rules and regulations.

Name .....
(Print Legibly)

Address .....

City .....

State ..... Age.....

Occupation ..... Hobby.....

I am enclosing a stamped, self-addressed envelope and the name-strip from the cover of this magazine (tear off name-strip so that the name THRILLING WONDER STORIES and the date can be seen). You will send me my membership certificate and a list of rules promptly. (Foreign readers must send an International Reply Coupon, or American stamps, with their applications or they cannot be accepted.)

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THE SAINT'S HERE AGAIN!

By Leslie Charteris

Having staggered joyfully through the Tenth Anniversary Issue of T.W.S.—as I stagger through all of them, anyway—and being temporarily stuck in some outlandish western village, and having nothing else to read, and having even studied all the advertisements I was finally bored into testing my IQ on your pleasant little SCIENCE QUIZ.

Naturally, I am accustomed to scoring 100% on this, and the main interest is in seeing whether I can complete the course in under ten seconds. However, on this occasion I encountered a couple of setbacks.

1. (To take the easier one first). "Take a Letter," No. 5. Quote: "Of all the modern mechanical inventions, probably the most marvelous is the: (a) steamship (b) airplane (c) locomotive (d) submarine." Unquote . . . Well, just to save superfluous headaches, I decided to ignore the word "probably," which in itself made the question (probably) impossible to answer. I plumped for the airplane. And it seems your question-maker prefers submarines. So what? So he prefers submarines. I prefer airplanes, and the hell with him. In other words, this is merely a matter of opinion, which might be argued for hours, and not a matter of knowing facts.

2. "Positive or Negative" (Journalese for "Yes or No") No. 3. Quote: "On the sun, except near a sunspot, a magnetic needle would point nearly North, as it does on Earth." Unquote. Gasp. I really have to spread myself on this. In the first place, what is "North?" On Earth, there is a "true" North, for map-making purposes. This is constant. Then there is a magnetic North, which is not constant. One end of a magnetic needle points in this direction, sometimes. The deviation varies not only from year to year, but also from place to place.

At certain times and places it is quite large. So how near is "nearly?" And what does the question mean, anyhow? Is this needle on the sun supposed to point as nearly North as a needle on Earth? As nearly as where on Earth, and when? And North of what? Does he mean the Earth's north? Or the Sun's north? And where is the Sun's north? Does he mean the upper end of the Sun's axis of rotation; and if so, which is the upper end? Does he mean the end which is on the same side of the ecliptic as the Earth's North Pole, and if so why doesn't he say so? T.W.S. is supposed to be a magazine of "science" fiction, and we scientists are pretty choosy about our words. We have to know exactly what we are talking about before we commit ourselves.—New Orleans, Louisiana.

(Mr. Leslie Charteris, as many of our readers are aware, is the creator of the famous fictional buccaneer of crime, The Saint, whose exploits have been featured on the screen, in books, and in national magazines, here and abroad. All we can say is—when the Saint gets on the trail, Heaven help us! . . . Mr. Charteris is quite right regarding the debatable ambiguity of the questions he refers to. On the second, the statement should have read: "On the sun, a compass needle reacts similarly to the sun's magnetic pole as on Earth"—answer, true. The "north" is simply a specific direction, and had nothing to do with the question proper, which meant to bring out the fact the sun has a magnetic pole. We're sorry for the confusion brought about. Mr. Charteris' IQ is 100%!—Ed.)

In this department we shall publish your opinions every month. After all, this is YOUR magazine, and it is edited for YOU. If a story in THRILLING WONDER STORIES fails to click with you, it is up to you to let us know about it. We welcome your letters whether they are complimentary or critical—or contain good old-fashioned brickbats! Write regularly! As many of your letters as possible will be printed herein. We cannot undertake to enter into private correspondence.

SURVIVAL OF THE FITTEST!

By Stanton A. Coblentz

The Tenth Anniversary Number of THRILLING WONDER STORIES is a cause for congratulation. Some of the stories, such as those by John Taine and John C. and Hulbert Burroughs, seem to me to be particularly good; while the "Meet Our Science Fiction Family" is an interesting addition.

It is no slight accomplishment for any magazine, science fiction or otherwise, to have survived for ten years in these times!

STATISTICS

By Manly Wade Wellman

The Tenth Anniversary Number of T.W.S. was good. In looking over the biographies of writers and artists, I found some interesting things.

Professions listed, past and present (excluding writing and illustrating science fiction): college professor, mathematician, photographer, explorer, cowboy, newsboy, waterboy, lumberjack, miner, surveyor, harvest hand, engineer chemist, editor, reporter, school teacher, salesman, bouncer, doctor, farm hand, riverman, house painter, mechanic, longshoreman, mill hand, truck driver, mining engineer, soldier, marine, blacksmith, boxer, wrestler, milkman, song plugger and publisher.

There are quite a few bachelors in the crowd; not many of them live near New York, the s-f capital; and, though one might expect jealousy in a field of writing so limited and with so much competition, most of them have very warm friendships with other s-f writers. —Scotch Plains, New Jersey.

BETTER ISSUES TO COME!

By John V. Baltadonis

Congratulations on your Tenth Anniversary Number, and for the swell issue you turned out!

There's only one thing I can say about "Dawn of Flame," and that is that it's swell! If you do intend to have a short novel in supplement form each issue, make sure they're worth reading. If that turns out to be the case, then you can mark me down as being in favor of the idea. However, if you hand us a lotta tripe, I vote thumbs down. From the start you've made with "Dawn of Flame," everything seems as if it'll be all right.

"Robot Nemesis," by E. E. Smith, Ph.D., was darned good. The story by John Coleman and Hulbert Burroughs was also very good. I hope to see more of their work in the future. Taine also contributes an interesting story in "The Ultimate Catalyst." Of the four short stories, I liked Keller's "No More Friction" and Kline's "Stolen Centuries" best. They were very good.

I don't see why you can't continue to have top-notch stories in future issues of T.W.S. If all the coming issues are to be as good as

this one, you'll have one of the best magazines going.

Of special interest was "Meet Our Science Fiction Family." I wish you'd continue the policy of including the picture and biography of every author together with his story in future issues.

This is undoubtedly the best issue of THRILLING WONDER STORIES yet. Keep up the good work!—1700 Frankford Ave., Philadelphia, Penna.

ALL-STAR CAST

By Walter Dennis

Just a line to let you know that you've done a fine job in the Tenth Anniversary Number of THRILLING WONDER STORIES. Certainly listed an all-star cast of writers and artists. One thing you missed, guys—a brief line-up of the five or ten most outstanding s-f fans of the last ten years. Maybe you'll include them in your Fifteenth Anniversary Number?—2509 NW. 25th St., Oklahoma City, Okla.

FAVORS FEATURE NOVELS

By Ernst W. Gschwender

After looking at the June cover of T.W.S. I am still convinced that you've had only one good cover so far. The one by Wesso. No brickbat over your inside illustrations.

I've been reading science fiction steadily since 1931, but I still feel like tearing off the cover and burying it under six feet of earth. I no longer wonder why my parents think I'm cracked when I bring home a magazine with a cover like the June cover. Although I finally did coax my father, a mechanical engineer, to read "No More Friction," which he liked.

The stories of this issue definitely made up for the let-down I had when I saw the cover.

But, then, I guess I shouldn't slam the covers to much. Maybe somebody liked it. Just like some people like surrealistic paintings.

Your new feature of a complete novel in each issue wins my approval. As to the kind of stories? Well, as much as I pan your covers I haven't a brickbat left when it comes to the stories. You're doing a swell job on your own hook.

If I let a word of praise slip in I also have to slip in a brickbat. We can't let you get a swelled head and have you looking like those two whatever-they-are you had on the cover.

In the first issue of STARTLING STORIES you wanted the readers to let you know which story they would like to have reprinted. My choice is "Monsters of Callisto," by Edward H. Hinton. This story appeared in the October, 1933, issue of Wonder Stories. I've never forgotten it and believe it worthy of being reprinted.

If you get down this far I'll know that you not only read the letters that are sent you but that you are patient regarding their short-comings.

The best of luck to all concerned.—7827 Senator Ave., Detroit, Michigan.

THE SFTPOBEMOTCOSFP

By Martin Alger

Just finished the June THRILLING WONDER STORIES and is it a wow! The best thing in the whole issue is that note in THE READER SPEAKS saying that you will continue to print one novel in each issue. My main kick about THRILLING WONDER STORIES has always been that the stories were too short. That is the main reason for my thinking your companion mag, STARTLING STORIES, the best s-f mag out. Now it seems that there will be TWO "best" mags published.

As to the stories, "Dawn of Flame" runs off with top place. "Passage to Saturn" and "Robot Nemesis" are very good also. All the stories were good, but these struck me as outstanding. Let's hope you can keep up the pace!

I am very much pleased by the Meet Our Science-Fiction Family dept. I had a lot of fun comparing the photos with mental pictures that I had formed of the writers and artists from their work. Hardly any of them looked at all as I had expected.

The illustrations were the best in a long time. Finlay and Wesso are the best, with Paul not far behind. I know that a lot of the new readers don't like Paul but while his work doesn't look as natural as some others there is a style about it that goes well with the fantastic nature of the stories. Perhaps I like him because he illustrated the first science-fiction mags I ever read.

There is only one thing lacking in THRILLING WONDER STORIES. THE READER SPEAKS isn't as interesting as it was in the old WONDER. Remember, the SPWSSTFM, "Den of a Stf-nut," poems by Hoy Ping Pong and Tuckeritis?

Speaking of The SPWSSTFM, the cover inspired me to organize the SFTPOBEMOTCO-SFP. (Society For The Prevention Of Bug-Eyed Monsters On The Covers Of Science-Fiction Publications.)

Yours for complete novels and more civilized covers.—Box 520, Mackinaw City, Michigan.

THAT STELLAR LINE-UP

By Ray Douglas Bradbury

Up to now I have been content to buy T.W.S. and just set back reading it, but this Tenth Anniversary Issue has got the old boiler burning and I couldn't resist throwing you a congratulatory word or two. It was a pip! Whatta lineup of big names. It reads like the hall of writers' fame to these eyes that have followed Wonder since I was nine. John Taine and Weinbaum would be enough to make me buy any issue, but as if that weren't sufficient you give us Keller and E. E. Smith and follow that up with a quick punch of Kline, Williamson and the Burroughs boys!

The whole issue was a fitting tribute to ten long years of up-hill battle. You have improved! I definitely believe that. I admit that when first I saw T.W.S. on the market some time ago I had misgivings, which have since been erased by each following issue. I've got a kick out of every issue since then.

How about some more pictures of the authors in your next issues? There are quite a few you've left out. Arthur K. Barnes for instance. No mag of yours seems complete without one of his swell stories.

And now, about the stories themselves. They were all good as far as I'm concerned. They couldn't help but be good. Look who wrote them. Those Burroughs boys look like promising bets for the future. Most of all I enjoyed John Taine's yarn.

I hope that he will write much more frequently from now on. "Robot Nemesis" was very enjoyable. I always have liked Smith anyway, good or bad.

Keller was up to his old quality with "No More Friction." More from him too, please.

As to the cover, well, it was all right, not exceptional, just all right. Why not get Elliot Dold to do one for you, or Wesso?

But, good luck! Thrilling Wonder is still growing. Don't make it wear the same clothes forever, if the shoe fits put it on and then when Thrilling's foot gets too big, take it off again.—Los Angeles, Calif.

(A picture and biography of Arthur K. Barnes will appear in the next issue—Editor.)

A THRILL A MINUTE

By Neil A. Lafferty, Jr.

Gosh! Wow! Boyohboy!, and so forth and so on. Yesiree, yesiree, it's the greatest in the land and the best that's on the stand, and I do mean THRILLING WONDER STORIES, and especially that great, magnificent, glorious, most thrilling June issue of the mosta and the besta of science fiction magazines.

Whew! I think I'll stop and take a deep breath, for I really do need it. Yesiree, it only took me eighty glorious minutes to get

around from cover to cover of the most thrilling magazine I've ever read. It was a WOW! No, it was more than that, it was, well, er, I guess there really isn't any possible combination of words that can truthfully describe the thrill I got out of the Tenth Anniversary Issue.

Yesiree, if you can equal the contents of the June issue each and every time hereafter, I bet you'll sell twice, nay, thrice the number of magazines you are selling now; yesiree, the whole magazine was simply perfect. One could ask for no more. Yesiree, can you imagine it, everything from Taine to Smith, and then again, from Weinbaum to Binder! And so it went, from the thrilling pen of one author to another. It was magnificent! To my estimation really, I don't think that you'll ever be able to do it again. Please don't take it as a brick-a-brat.

Well, I guess I've run out of adjectives so I'll bring this little letter to a finish, oh yes, not before I congratulate you on your "Meet Our Science Fiction Family." Yesiree, it was, I truly believe, appreciated by everyone. Well, here's luck to many, many more such issues.—59 Talman Street, Brooklyn, New York.

RARE ISSUE

By Clem Gullian

A few words about the Tenth Anniversary Issue. Undoubtedly it will be a rare issue of T.W.S. No one would have thought ten years ago that such an array of authors could be presented in one magazine. Congratulations upon your accomplishment.

"Dawn of Flame" cuts a deeper niche in science fiction's Hall of Fame for Stanley G. Weinbaum. My only regret is that it wasn't twice as long.

Keller's "No More Friction" and Kline's "Stolen Centuries" were excellent. Smith and Taine were fair—it's quite obvious that both of them need more room in which to hop their stride. Smith just got the guns booming when the story ended.

The six pages of pictures and biographies were the Tenth Anniversary Issue itself. I enjoyed the material about the artists most. That was something entirely new. Thanks again for a superb issue.—195 Arthur Ave., S.E., Minneapolis, Minn.

POWERFUL ARRAY

By Frederick Morgan

Congratulations on your Tenth Anniversary Issue. It was an important occasion, and I would like to point out the things that impressed me.

In the first place, the imposing array of names. It is my guess that Smith, Taine, Weinbaum, Williamson, and Keller are five of science fiction's eight most popular authors. You also introduced us to the two sons of another, Edgar Rice Burroughs. A. Merritt and John W. Campbell, Jr., would have made the line-up complete. Even so, it was a powerful array.

The cover was not so good. Brown would do better with a darker background and less sharp contrasts. The interior illustrations were fine, with Finlay taking the honors.

Now for the important part, namely, the stories. Taine's "Ultimate Catalyst" was a real treat. None of your hack writing here. It's the best novelet in years. Kline's short was good, with its tricky ending. The Burroughs boys were not so hot. Their novelet seemed a little too routine and ordinary. Binder's short was above average hack.

Williamson's "Passage to Saturn" was an excellent short, but it should have been longer. Williamson is definitely good; in fact, I would not hesitate to name him the best s-f writer now contributing regularly. However, he needs plenty of space in which to develop one of his masterpieces.

"Robot Nemesis" was good, but not extraordinary. In his long novels, E. E. Smith strings together many episodes, some excellent, but more, in my opinion, ponderous and windy. This novelet consisted of one such episode and showed Smith neither at his best nor his worst.

"No More Friction" was a minor effort, but even so it was amusing and Dr. Keller is always welcome. Your last story was by no means your least. I had previously read "Dawn of Flame" in the Weinbaum Memorial Volume, and consider it one of the great s-f works of all time. You are to be congratulated on printing it in T.W.S.

In conclusion, masterpieces by Weinbaum and Taine make your Tenth Anniversary issue a memorable one, the best issue since the new regime began. Need I ask you to keep it up? —39 West 11th St., New York City.

SPACE-SHIP COMPLEX

By Herbert Vincent Ross

As an enthusiastic reader of the old Wonder under Gernsback, and of the new, a few words from me may be of some interest. First I have a kick or two! Please don't let the mag develop a "space ship" complex. Far too many of the stories, it seems to me, are about distant planets, strange forms of life, hurtling space ships, interstellar transport, etc., etc.

Now all of this may be the very life blood of science fiction, and rightly so, but after a time one becomes just a bit bored with the "sameness" of it all, no matter how skillfully done. Now a few years ago we were getting more variety in our s-f. Looking through some old bound copies I find such tales as: "Isle of the Gargoyles," an interesting tale by William Lemkin, Ph.D. which is s-f at its best, yet the characters never leave this planet . . . and again: "Death from Within" an intriguing mystery built around modern physics . . . (never a space ship!!!!!) Here is to my mind one of the finest things Weinbaum ever did; I refer to "Pygmalions Spectacles," a tale outstanding for its distinctive literary style.

"Point of View," also by the same brilliant author, in which the characters look through the senses of another person and as the title suggests get another point of view (in this tale we see a room through the eyes of a common house fly!) which is great stuff!

Then here is Arthur K. Barnes with "Emotion Solution" and Edmond Hamilton with "Cosmic Pantograph," "Man with the Four Dimensional Eyes," by Leslie F. Stone, etc., etc. Get what I mean?—hardly a space ship!

Well, all these tales were to my mind good s-f, and something could be learned from most of them. Now today we seem to have gone beyond the bounds of probability or reason, (see "The Great Adventure," by Cummings, in the December issue). Lets have fantasy by all means, even that brand which makes the mind reel with its implications and possibilities, but do not forget the other type of "Earthy" tale.

Whilst on the subject, STARTLING STORIES sure had a good send-off with "Black Flame" by the old master, and a swell line-up. Here's wishing it luck; it certainly fills a long felt want for s-f fans. Now to get back to T.W.S. "Metal Ocean" quite a la Binder, and quite good, also a nice artist . . . Wesso? Don't forget Paul now that he is doing work for you again. It may be sentiment, but he is still to me the artist, although he has now quite a few competitors, some of them quite new to this field of work.

You promised more by C. A. Smith, but so far we have had only one tale from his gifted pen. Let's have more also from Carl Jacobi ("World in a Box") SCIENTIFACTS is a very interesting feature, but I wish you'd change that cut for the heading. The old "Wonder Stories" also had a longer "Blurb" under the title of the stories . . . you know . . . giving us some idea of what was to follow in the tale . . . for better or worse! I liked that better than the present way, although it may be more modern, of two or three words. Should also like to see on the cover the old motto "Prophetic Fiction is the Mother of

Scientific Fact." It sort of explains the magazine.

This letter has just about covered everything, and you must have a pretty good idea of what I want to see in it. But as I am only one in many thousands I cannot complain, after all, if no notice is taken of my wishes, for it is understood that the mass shall decide, and a policy that pleases the mass of the readers must be the right one from every point of view. I think that for the most part T.W.S. has this policy. However, my remarks taken with the comments of the other readers may add up to something and will I hope be taken in the spirit in which it is sent—that of constructive criticism.

In any case, I am a firm friend of scientifiction, and shall continue to support those who are doing the most for it. This of course means T.W.S. amongst others. I see that a certain Misti Selkirk has joined the Science Fiction League, and if this should catch the eye of the person concerned, would he please get into touch with me, as I am keen to know more about a certain event of the so called "supernatural" which this member wrote about in a magazine of weird fiction. It concerns the old legend of the werewolf, and I should like to hear more about the two "things" from the canyon in Peru. What about it Mr., Mrs. or Miss Misti Selkirk of Box No. 3 Hotel Junin, La Oroya, Peru, South America. Do I get a letter? Was the incident fact or fiction?

In conclusion, ed., thanks for listenin', and good luck to T.W.S.—71 Harley Street, London, W. I., England.

ANSWERS TO SCIENCE QUIZ

(See Pages 58-59)

POSITIVE OR NEGATIVE

1. False. The number is less than 1,200.
2. True. Minerals and the water soluble vitamins hasten from the confines of solid food into the surrounding liquid.
3. True.
4. True.
5. False. The rays are 10% more intense near the Poles than at equator.
6. False.
7. True.
8. True.
9. True.
10. False.
11. True.
12. False.
13. True.
14. True.
15. False.
16. True.
17. True.
18. True.
19. True.
20. False. 39° to 54° is the most favorable condition. You now have a swell alibi if you've fared badly in this Quiz—blame it on the temperature!

TAKE A LETTER

1. b; 2. a; 3. b; 4. c; 5. d; 6. d; 7. a; 8. b; 9. d; 10 c.

PHYSICS MATCH

3, 4, 9, 2, 6, 5, 10, 1, 8, 7.

NUMBER, PLEASE

1. a. 1/5; b. 19; c. 12; d. 200.
2. 10, 10, 10.
3. 2, 4.

R-EVOLUTION

1. gamete, 2. mutant, 3. atavism, 4. atrophy, 5. genotype, 6. genetics, 7. chromosome, 8. adaptation, 9. environment, 10. orthogenesis.

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29x4.75-20	2.50	1.25
29x5.00-19	2.85	1.25
30x5.00-20	2.85	1.25
6.25-17	2.90	1.35
28x5.26-18	2.90	1.35
29x5.25-19	2.95	1.35
30x5.25-20	2.95	1.35
31x5.25-21	2.95	1.35
6.50-17	3.35	1.40
28x5.50-18	3.35	1.40
29x5.50-19	3.35	1.45
6.00-17	3.40	1.40
30x6.00-19	3.40	1.40
31x6.00-20	3.40	1.45
32x6.00-20	3.45	1.55
33x6.00-21	3.65	1.55
32x6.50-20	3.75	1.75
6.00-18	3.75	1.45

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31x4	2.95	1.25	34x4½	3.45	1.45
32x4	2.95	1.25	30x5	3.65	1.65
33x4	2.95	1.25	32x5	3.75	1.75
34x4	3.25	1.35	33x5	3.95	1.75
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34x5	3.95	2.25	30x8	11.45	4.95
32x6	7.95	2.95	40x8	13.25	4.95
36x6	9.95	4.45			

TRUCK BALLOON TIRES

Size	Tires	Tubes	Size	Tires	Tubes
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6.50-20	4.45	1.95	8.25-20	8.95	4.65
7.00-20	5.95	2.95	9.00-20	10.95	5.65
			9.75-20	13.95	6.45

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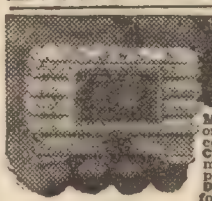

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THE STORY BEHIND THE STORY

WHEN the lambent fires of inspiration grow dim, and when a science fiction writer hasn't the slightest idea in all the nine worlds where his next plot is coming from, there's always one ace left in his bag of tricks that is good for a corking yarn.

The writer has merely to take the ordinary variety of story, repeat the plot mentally—and then reverse it! And he's transferred blank paper into profit. A story in which a man creates a robot would be the usual sort of thing. But a story in which a super robot creates a synthetic man — that's news! A yarn in which your hero goes into the past is old stuff. But write a story in which a man from the past comes into our present —and you've got something!

There are many other examples—you can work them out for yourselves. It's simple—just throw the gears in reverse!

THE TIME CAPSULE

Only a seven-foot metal cylinder, the Time Capsule buried in the grounds of the New York World's Fair has already commanded international attention. If posterity can hold out for some six thousand years, the ultimate opening of the Time Capsule should produce a sensation—even if we're not around to witness it!

Robert Moore Williams noted all the publicity regarding the Time Capsule—and reversed it. Suppose humanity of today were to discover a Time Capsule left for us by a mighty civilization of yesteryear, he wondered? What then? Couldn't he tell a story concerning the startling secrets such a strange heritage would reveal to us? You bet! And "The Warning from the Past," this month's feature novelet, tells the story of dawn's Time Capsule. Here's what Robert Moore Williams has to say about his yarn:

The true Story Behind the Story for "Warning From the Past" is more than a little complicated. In the first place, I wrote a yarn called "The Man Who Looked Like Steinmetz." You guys liked it pretty well, so, eventually, I wrote a sequel to it, said sequel having a title "The Time Capsule." Now don't go looking in the back numbers for the yarn, and don't expect it in the future. It's right here in my files. Ye editor didn't like it and he tied a can to its tail. But ye Ed—bless his thoughtful heart—did like the idea and he kindly suggested I do a story around it. Suggestions like that are almost never ignored by the lads on this end of the typewriter. I didn't ignore this one. The result was—"The Warning From the Past."

So much for how the story happened to be written. As to the contents—well, I strongly suspect that more startling history has occurred right here on Earth than has ever appeared in the books devoted to the subject.

BEST FUN, FICTION AND FOTOS IN

I'm not knocking the historians; they spend much time in patient research trying to discover what has happened in the past. They have a general idea of some of the things that have happened during the last two thousand years. Ask them what happened four thousand years ago and they begin to get vague. Six thousand years leaves them hopelessly bewildered.

And yet sub-man appeared on Earth at least half a million years ago! Which brings up the question: What was man doing during the 495,000 years about which we know nothing! Throwing rocks at the birds, skulking in caves, fighting, eating, sleeping, dying. Was that all?

Or is it possible that races of men reached civilization in the past, and perished? I don't know the answer. Nobody seems to know. Meanwhile the statues on Easter Island gawk at the rising sun and the ruins of long vanished cities are visible under the shallow waters of the Pacific, raising questions that most of us prefer to ignore.

As to the ending of the story, I could have dished up some boiled tripe in the form of a happy fade-out, with the hero on a white horse riding under pink clouds into the sunset, the heroine riding pillion with him. But —I don't write that kind of story! Get me straight—I'm not knocking a happy ending. It's all right if it belong in the story. But—

When the noses are counted after the fighting is over, it is almost invariably true that the bravest, the finest, the fittest are not included in the count. They are dead. Darwin's reversal of selection in time of war.

Which brings up the subject of war and brings me to an abrupt end, for I hold such violent convictions on the folly of war that if I let myself start writing on the subject, I'll be at it this time next week.

SCIENCE VS. THE ANCIENTS

Friends, Romans, and T.W.S. followers—step up and meet Kelvin Kent, the creator of Pete Manx, twentieth century pitchman in the past. Pete Manx has one philosophy—when in Rome do as the Romans do, or you'll be tossed to the lions. But for the present we're tossing Mr. Kent to the readers!

In a recent issue of THRILLING WONDER STORIES Jack Binder devoted his "IF" feature to a discussion of how a modern man could make a living in ancient Rome. For some reason this fascinated me, and my thoughts kept recurring to the idea often during the evening. In fact, I was so interested that I even dreamed about it that night! I couldn't remember much of my dream on awaking, but my vague impressions were crystallized, and I decided to write a story on the subject.

A story without conflict doesn't amount to much, I've heard, so I created two rivals, one of them a stuffed-shirt scientist, and the other a hardboiled pitchman. The question in my mind was whether a knowledge of science would help in archaic times, and when I began the narrative, I had no idea how it would end. I just wrote it.

And it took considerable research and brainwork to fit the jigsaw together—much more than the casual reader might imagine, for it was necessary that I know what inventions, games, metals, and so forth, were in use in the times of Claudius and Messalina.

At first I was tempted to make use of a galvanic battery, but changed my mind when I discovered that zinc was unknown in old Rome. My final conclusion, on finishing the story, was that anybody, layman or scientist, would have a hell of a time trying to make a living in either the grandeur that was Greece or the glory that was Rome.

(Continued on Page 126)

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(Continued from Page 125)

But, anyway, I hope the readers will like the tale.

A WINGED RACE

Man treads this globe undaunted, its very lord and master. That evolution, through a tricky combination of chance and circumstance, conspired with the elements to make him master of the Earth is a fact we rarely stop to consider. Suppose she had decided to develop some other species to be the most superior? What would have been the fate of Man?

That's the premise Stanton A. Coblentz wants you to accept when you read his brilliant satire, THE MAN FROM XENERN. He handles his story in fascinating fashion . . . and we think you'll accept it enthusiastically.

It is perhaps largely a matter of accident than man is supreme on this planet. In some ways certain other creatures such as the birds, with their capacity for flying without the aid of "super-powered" plans, are better suited than we to rule the world. Given a planet that has developed birds of sufficient size and intelligence, and we might expect the dominant race to be one of feathered, egg-laying bipeds.

This is the central idea that led me to write "Man from Xenern. The story also has, however, as one of its central supports, the conception of a human race made so weak and degenerate by warfare that it has relinquished its one-time superiority. Who that observes present-day tendencies among the nations can believe this idea to be altogether fantastic, or can suppose that there is any cosmic law of certainty providing that **homo sapiens** is always to rule the planet Earth?

COSMIC ENIGMA

Graph Waldeyer, whose prize amateur story, "Cosmic Cube," is featured in this issue, seems to be pretty versatile as an amateur. Not only does he ring the bell when it comes to writing, but he goes in for amateur astronomy in a big way. Indeed, it was this second hobby of his which served as the source of inspiration for his tale. But let him tell you about it in his own words:

As on many another evening I took the four-inch refractor out to the back yard. Looked at Saturn. Rings opening out at last. There's old Jupiter. Big Red Spot. Ganymede's shadow. Ho, hum. Pretty, but seen it all before. Why doesn't something happen!

Neighbors peeking from behind window shade. Probably think I'm nuts. A. G. Ingalls, Telescoptics editor, says all amateur skygazers nuts. He's got us pegged . . . but why doesn't something happen—something to rock Earth's astronomers right back on their heels!

And so the idea for the Cosmic Cube was born. Supposing a strange, unclassifiable object appeared in the sky, and went through erratic unpredictable actions that seemingly violated all the laws governing objects in free space. Imagine Earth's scientists running around in circles as the Cube busted one physical law after another. And supposing the mystery had to be solved in a hurry—or good-by Earth!

First, of course, I had to solve it myself. How to explain such an object logically, scientifically, in a manner that would set well with that critical, hawk-eyed bunch, the science-fiction fans? After a good deal of thought and some polishing up on physics I had it.

BEST FUN, FICTION AND FOTOS IN

The plotting hadn't progressed far before I found that a detective was needed to unravel the clues dropped by the Cosmic Cube in its rambling across the sky. No ordinary detective, but one who could succeed where Earth's scientists had failed. A sleuth astute as any in the annals of detection, fictional or real, but who applied his deductive and reasoning powers to the cosmic scene instead of to mundane crime.

Frankly and unblushingly, I patterned my sleuth after the greatest detective of all time, Sherlock Holmes. (Incidentally, Holmes himself could never have solved the mystery of the Cosmic Cube; he maintained that astronomy was of no value in his field, even boasted to his friend Watson that he didn't know the distance of the moon from the Earth.)

With the essential material for the story now in my possession I put it to a rigorous test by submitting an outline containing the essential clues to a couple of young science-fiction fans of my acquaintance. To my elation they failed to tumble.

After that I wrote the story with confidence.

MYSTERY MOON

One side of the moon will always present an eternal mystery to humanity. For, despite the vigilance of Earth's astronomers, regardless of the super-telescopes that engineers may possibly perfect one day, one side of Luna will forever remain hidden from human gaze.

Otis Adelbert Kline tears the shroud off this astronomical mystery in his interplanetary novel, "Race Around the Moon." The theory that the moon did not originate in our own Solar System is a brand-new one (as inspection of your twenty-foot shelf collection of back numbers will assure you) and we think Mr. Kline has done justice to his excellent theme. Mr. Kline speaking:

The basic idea for the story, RACE AROUND THE MOON, came to me while speculating on what might be on the other side of the moon. No Earthman has ever seen that part of the moon which is constantly turned away from its primary; no Earthman ever can unless he does so in a space ship.

It is conceivable that tidal pull acting on a satellite revolving for æons about its primary, and always turning the same surface toward it, while yet that satellite was in a semi-liquid state, might produce a conformation such as is described in this story.

It is conceivable, also, that if the moon did not originate in the Solar System, but is a captured wanderer from outer space, it might, at one time, have had a tremendously larger primary, which would have heightened the above-mentioned effect, in the system of a dying star. It might have been inhabited by intelligent beings who, feeling that they must, eventually, find a new, warm star in order to survive, devised the means of locomotion in this story to leave their own system and enter the Solar System. A number of such devices occurred to me, but I was not satisfied with any of them.

Otto Binder, the "O" in Eando Binder, occupying a desk next to mine, had also reached a point of stalemate in a story on which he was working. We discussed our troubles. In a few minutes, he had supplied me with the very idea I needed to complete my yarn, and I had performed a similar service for him.

After that, conversation ceased, and typewriters clicked on until both stories were completed.

That's the Story behind the Story in a nutshell. Some interesting speculations, the

(Concluded on Page 128)

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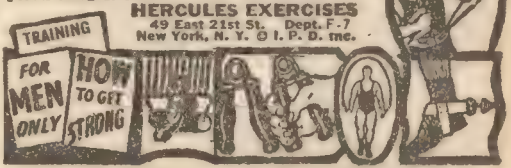

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(Concluded from Page 127)

dramatization of these speculations in story form, a swap of ideas, and a photo finish for Binder's yarn and THE RACE AROUND THE MOON.

PARADOX IN TIME

Maybe you haven't noticed it, but THRILLING WONDER STORIES rarely goes in for time-traveling yarns. They're plenty popular, we admit, but the avalanche of mail that hits our desks after a time yarn has been published reaches several cubic feet high. Compliments? Never? The most expert gang of flaw-finders in the United States rip the author's postulates and theories apart, sentence by sentence. So—we run them only when we're certain they're foolproof.

Lyle Gunn, an author new to this magazine, does an excellent job of presenting a time-traveling tale that we think is free from paradoxes and boners. Read his THE TIME TWIN now. The author promises to reply to all readers' squawks, so give this the works. Here's Mr. Gunn's prologue:

I feel obliged to acknowledge my debt to the editors of T.W.S. for the story, THE TIME TWIN, in its present form. For several years I had deplored the general repudiation of time-traveling stories and hoped for a way to resolve their common paradox, the "traveler" appearing in a time whose space-frame held no place for him. I **thought** I had it when I got the idea of the fourth dimensional twin—or double, as the editors pointed out it really was, in my first version of the story.

That far, however, I was at least on sound scientific ground. It is generally accepted that the Universe is running down, that disorganization is increasing, matter being gradually destroyed and its energy set free in radiation. But no less an authority than Jeans has declared that the process may be reversed, and Milne also believes that under certain conditions radiation is transformed into matter. As to the possibility of the world and its history being duplicated eventually in that ceaseless process, Eddington, in the Gifford Lectures, said that while the adverse chances against recovery of organization, or any accidental coincidence, are overwhelming—the contingency is definite.

Nevertheless, my story fell into the paradox I was trying to avoid, and it is the editors of T.W.S. who extricated it by giving it a true twin, and thereby a place for the time-traveler in the space-frame. I am grateful for a better story, but even more enthusiastic for the many new possibilities that have been opened. I hope that others of your contributors will share my feeling, and that the clouds will be swept away from time-traveling fiction.

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SCIENCE QUESTIONS AND ANSWERS

(Concluded from Page 115)

So you can see, the fictional extensions of fantasy writers are not based in myth, but have their counterpart, in miniature, in nature.—Ed.

PLUTO

Editor, SCIENCE QUESTIONS AND ANSWERS:

Unless I am mistaken, Pluto should be in the neighborhood of four billion miles from the sun. Have any discoveries of note been made concerning it?—K. W., Loyalton, California.

The latest evidence on Pluto indicates that its distance from the sun varies from 4,000,000,000 to 7,400,000,000 kilometers (approximately 2,750,000,000 to 4,630,000,000 miles). The planet is at present moving toward the perihelion or shorter semidiameter of its orbit, and will reach its minimum distance from the sun about 1989. The Plutonian year is therefore in the neighborhood of 250 years long.

The apparent diameter of the planet is about 2½ times that of the Earth, or about 20,000 miles. The planet moves so slowly in its orbit, covering only 300,000,000 miles a year, or slightly more than one degree of arc per year, that we must be patient for a few decades before definite evidence of its size, orbit and other characteristics are positively ascertained.—Ed.

WHY STARS TWINKLE

Editor, SCIENCE QUESTIONS AND ANSWERS:

The simplest stellar phenomenon is the twinkling of the stars. Yet no one I know has been able to provide me with a reasonable explanation as to why stars twinkle. Can you enlighten me?—E. K., Flushing, N. Y.

No explanation yet offered has quite satisfied scientists as to why stars twinkle. The theory that their light interferes with itself on its journey through space is not altogether satisfactory. The suggestion that the thin pencil of light from a star is disturbed in our atmosphere, thereby giving a twinkling effect, is also inadequate.

Another theory has been proposed by Professor Vegard, of Oslo University, Norway. He declares that on the borders of the Earth's atmosphere is a layer made up of tiny crystals of nitrogen, or nitrogen dust; that the Earth is enclosed in what has been described as a crystal globe; and that this layer of crystals high up in the atmosphere is responsible for some of the many strange things that happen. It makes long-distance wireless possible by reflecting the waves and preventing them from being lost in space. It is the cause of the greenish color of the Aurora Borealis; and to it is due the twinkling of the stars. This layer, of course, is the Heaviside Layer.

The density of the dust-layer of nitrogen, Professor Vegard explains, is very small and the average distance between the particles is comparatively large. If we drew a line through the dust atmosphere it might cut only a few particles, and this number might undergo many rapid changes. When we look at a fixed star with the naked eye it is the average intensity through a cylinder, with a cross-section equal to the pupil of the eye, which determines the observed light intensity. Inside such a narrow cylinder the number of scattering particles may undergo many variations, and these variations may be seen as twinkling.—Ed.

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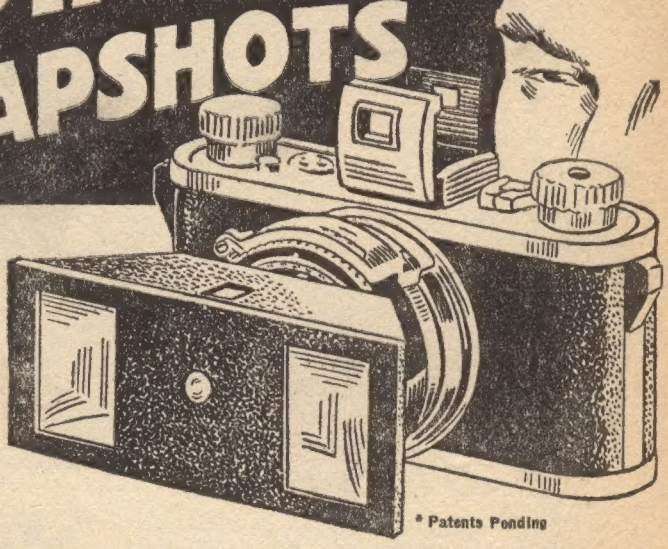

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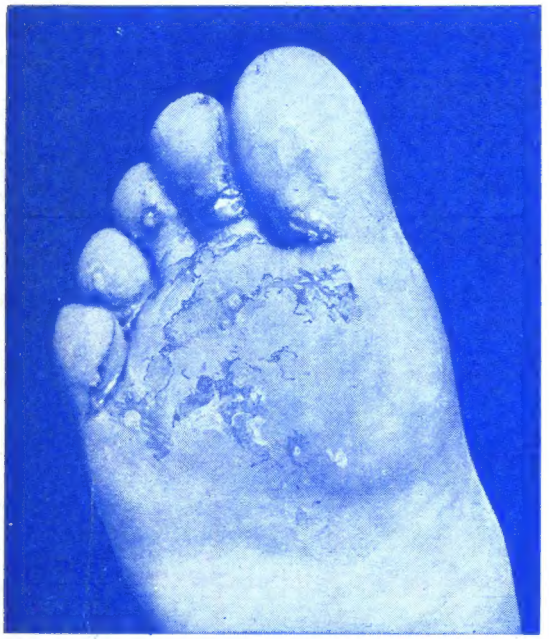

ATHLETE'S FOOT

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According to the Government Health Bulletin No. E-28, at least 50% of the adult population of the United States are being attacked by the disease known as Athlete's Foot.

Usually the disease starts between the toes. Little watery blisters form, and the skin cracks and peels. After a while, the itching becomes intense, and you feel as though you would like to scratch off all the skin.

BEWARE OF IT SPREADING

Often the disease travels all over the bottom of the feet. The soles of your feet become red and swollen. The skin also cracks and peels, and the itching becomes worse and worse.

Get relief from this disease as quickly as possible, because it is very contagious, and it may go to your hands or even to the under arm or crotch of the legs.

HERE'S HOW TO RELIEVE IT

The germ that causes the disease is known as Tinea Trichophyton. It buries itself deep in the tissues of the skin and is very hard to kill. A test made shows it takes 15 minutes of boiling to kill the germ; so you can see why the ordinary surface remedies are unsuccessful.

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When you apply H. F. you should find that the itching is quickly relieved. You should paint the infected parts with H. F. night and morning until your feet are better. Usually this takes from three to ten days, although in severe cases be sure to consult a specialist.

H. F. should leave the skin soft and smooth. You may marvel at the quick way it brings you relief; especially if you are one of those who have tried for years to get rid of Athlete's Foot without success.

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